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THE

ENTOMOLOGIST'S MONTHLY MAGAZINE

EDITED BY

K. G. BLAIR, B.Sc., F.E.S.
W. E. CHINA, B.A.
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J. J. WALKER, M.A., R.N., F.L.S.
PROF. E. G. R. WATERS, M.A., F.E.S.

VOLUME LXIV.

[THIRD SERIES.—VOL. XIV.]

'J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.'—*Laboulbène*.

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ENTOMOLOGIST'S MONTHLY MAGAZINE

VOLUME LXIV.

[THIRD SERIES, VOLUME XIV.]

NEPTICULA SUBERIVORA Stt. IN THE ISLE OF WIGHT.

BY E. G. R. WATERS, M.A., F.E.S.

Any naturalist who has visited Ventnor, in the Isle of Wight, will have noticed the numerous bushes of evergreen oak sprinkled, like junipers on inland chalk hills, over the steep slope of St. Boniface Down, the hill overlooking the eastern end of the town. On April 17th, 1927, in the course of a short visit to Ventnor, while scrambling about this hillside, I glanced at some of these bushes, not expecting to find on them anything but *Lithocolletis messaniella* Z., blotches of which species were common enough, and a few moths already on the wing. It was not long, however, before my attention was caught by some *Nepticula* mines. No species of *Nepticula* has hitherto been recorded as feeding on *Quercus ilex* in this country, and the mines were not identical with those of any British species attached to *Quercus robur*. Moreover, on looking round, I found some mines containing larvae which were feeding; whereas no known British species of *Nepticula*, with the exception of *N. aurella* Stt. on bramble, feeds in April. I therefore collected a score of larvae for further investigation, and, returning next morning, obtained nearly sixty in about an hour, besides a large number of empty mines. A few larvae died in the mines, but the majority pupated within about a week. The first moth, a handsome dark-purplish orange-headed insect, rather large and robust for a *Nepticula*, appeared on May 17th; between that date and May 30th sixty-one moths emerged, not a single cocoon producing a parasite. Attempts to identify the species with any of those known to feed on *Quercus ilex* on the Continent were

unsuccessful. Specimens were therefore submitted to Mr. E. Meyrick, who at once pronounced them to be *N. suberivora* Stt., hitherto recorded only from the Riviera (Cannes), where its food-plant is the cork tree, *Quercus suber*.

The original description of *N. suberivora*, based on specimens obtained at Cannes in 1867, was published by Stainton in 'The Tineina of Southern Europe,' London, 1869, p. 228. It is excessively brief, and in many respects imperfect. The material now in my possession enables me to describe all the stages of this species with greater precision and completeness :—

Imago. *Antennae* ½, dark fuscous, apex whitish. *Head* ferruginous or ferruginous-ochreous; *antennal eyecaps* and *collar* light ochreous. *Thorax* purplish-fuscous. *Forewings* shining fuscous, densely irrorated with coarse dark purplish-fuscous scales, less densely in apical half; *cilia* grey, lighter towards their apices, shining fuscous basally along termen, with one or two rows of purplish-fuscous scales close to termen. *Expanse* 5–7 mm. *Hindwings* dark fuscous in ♂, grey in ♀, lighter towards base; *cilia* about 4½, grey, apices lighter. *Underside* dark fuscous, *forewings* with large elongate white or whitish spot above tornus, indistinct in ♀. *Abdomen* in ♂ fuscous, with ferruginous-yellow anal tuft; in ♀ shining grey. *Legs* fuscous above, sides and joints ochreous-whitish. (Described from 59 specimens.)

Egg a silvery globule, placed on the upper surface of the leaf, very frequently in the groove of a nervure.

Larva (in its last instar) about 5 mm. long, bright amber-yellow; *mouth* dark brown or blackish; *prothorax* with light brown dorsal plate, outlined almost circularly with dark brown, sides pale yellow; *last three segments* orange-yellow on dorsum, owing to a darkening in the anal end of the intestinal canal. *Mine* a long gallery, not crossing itself, rather fine at first, but soon increasing in width, and attaining a width of 2 mm. in the latter portion; tortuous at first, afterwards angular or forming wide curves, and often following a nervure or the edge of the leaf for a considerable distance; in some of the longest examples the total length of the mine, if straightened out, would be about 45 mm. *Frass* brown, abundant and dense, its colour visible through the leaf-cuticle, almost entirely filling the mine in its earlier part, but in the latter part leaving a narrow margin on either side; owing to the thickness of the leaf-cuticle the mine is not transparent, even where there is no frass; when dry (*e.g.* in pressed specimens) the frass turns a paler brown, thus causing the mine to contrast still more conspicuously with the rest of the leaf. When the larva has finished feeding, it excavates a small chamber, free from frass, of about 5×2 mm., and quits the mine through a semicircular slit in the upper cuticle.

Cocoon (not mentioned by Stainton) a somewhat flattened ovoid, broader at the end from which the imago emerges; length 2.5–3.5 mm., breadth about 2 mm.; strongly made of closely woven silk, encased in dense silken floss; uniformly warm brown. *Pupa-case* (when empty) fairly firm, semi-transparent; occasionally projecting from the cocoon after the emergence of the imago, but usually remaining within the cocoon.

Suberivora is not likely to be confused with any other British species by anyone who breeds it. The larva and mine are not unlike those of *N. atricapitella* Hw. on *Quercus robur*, but the

mine is much coarser and the frass is not collected into a central thread. The cocoon is much more ovoid and much more woolly than that of *atricapitella* or any other of the larger British *Nepticulae*. The imago may be separated from *N. pomella* Vaughan and *N. oxyacanthella* Stt. by the coarseness of the purplish scaling; from *pomella* also by its darker colour; from *oxyacanthella* also by its much larger size; and from all other purple-tinged British *Nepticulae* by the fact that the purple suffusion extends over the whole forewing. The white spot on the underside of the forewings is also a striking and unusual feature. I have no personal knowledge of the species of *Nepticula* found on *Quercus ilex* abroad, but *N. ilicella* (Const. MS.) Wlsm. is stated to have a red larva and a small inconspicuous mine at the edge of the leaf (Ent. Mo. Mag. xxvii, p. 152); *N. ilicivora* Peyer. has an amber-yellow abdomen (Ann. de la Soc. Entom. de France, 1872, p. 203); and *N. anypoptus* Joannis (an unpublished species to which Mr. J. Hartley Durrant has drawn my attention) has a green larva. *N. suberoidella* (Const. MS.) Wlsm. (Ent. Mo. Mag., xxvii, p. 152) is now referred by Mr. Durrant to *Tischeria aurifrontella* Rag. There is no danger, therefore, of confusion between any of these species and *suberivora*.

The occurrence of *N. suberivora* on *Quercus ilex* instead of *Q. suber* need cause no surprise. The two plants are closely allied, and probably possess almost identical food-qualities. No doubt it is impossible to determine how or when *suberivora* was introduced into the Isle of Wight. *Quercus ilex* is an introduced tree, recorded to have been planted in England as early as the sixteenth century; I have not been able to discover how long it has existed on St. Boniface Down. Mr. J. F. Rayner (author of 'A List of the Alien Plants of Hampshire and the Isle of Wight,' Newport, 1925, and other botanical works), to whom I applied for information on the subject, was unable to furnish any particulars except that the bushes are believed to be self-sown from planted trees in the vicinity. The late Lord Walsingham, who was familiar with *Nepticulae* on *Quercus ilex* in the South of France, did not meet with *suberivora* during his residence at St. Lawrence, close to Ventnor, 1898-1905; but this may have been (as Mr. Durrant has pointed out to me) because his interest at that time was mainly in sea-shore species feeding on low plants. The complete freedom of the larvae from parasites suggests that *suberivora* is a quite recent arrival, escaping for the present the attentions of its natural enemies. In this warm and sheltered locality, with its chalky soil

and southern aspect—a veritable sun-trap—the moth, like its food-plant, seems perfectly at home.

My best thanks are due to Messrs. E. Meyrick, J. Hartley Durrant and J. F. Rayner for their kind assistance.

(Since the above was written, four other *Nepticulae* attached to *Quercus ilex* have come to my notice, viz. *N. suberis* Stt., *N. ilicis* Joannis, *N. viridella* Joannis, and an unnamed species; cf. C. Mendes, in 'Brotéria,' serie zoologica, ix (1910), pp. 164-5, and xi (1913), pp. 26-9. The first three have pale markings on the forewings—*suberis* a fascia, *ilicis* a dorsal spot, *viridella* a sometimes interrupted fascia. The unnamed species, which has not been adequately characterised, is said to have an inconspicuous mine. It is noteworthy that in Portugal all four are found on both *Quercus ilex* and *Q. suber*.)

184 Woodstock Road, Oxford.

December 7th, 1927.

AN OBSERVATION ON THE COPULATION OF *STYLOPS*.

BY W. S. BRISTOWE, B.A., F.Z.S.

The scarcity of information relating to the habits of *Stylops* is thought to be sufficient excuse for the present record of a chance observation made in 1919. On April 19th of that year I was walking down a path in a garden at Cobham (Surrey) and I noticed a sleepy bee, afterwards identified as *Andrena wilkella* K., on the ground in front of me. I picked it up on the end of a pencil, in order to examine it more closely. As I did so, a male *Stylops wilkellae* Perk. approached with fluttering white wings and, after circling round once or twice, settled on the back of the bee and proceeded to dig its 'tail' firmly into the bee's abdomen near its extremity. I enclosed the *Andrena* in a box, and not till quite half a minute later did the *Stylops* leave the bee. Later examination showed that the bee's abdomen contained two females of *Stylops wilkellae*. I am indebted to Mr. E. B. Nevinson for the above names, but I understand that Mr. R. C. L. Perkins is responsible for the identification of the *Stylops*.

Cobham, Surrey.

November 5th, 1927.

CALODERA ULIGINOSA Er., A COLEOPTERON NEW TO BRITAIN.

BY P. HARWOOD, F.E.S., AND B. S. WILLIAMS.

A single specimen of this species was found by each of us in some flood-rubbish collected from the banks of the river Stour near Christchurch, Hants, in October, 1925; a third specimen occurred in 1926 and four more in 1927 in the same locality.

The species is allied to *C. riparia* Er., but is considerably larger and more robust and of a deeper black colour, the basal joints of the antennae, knees and tarsi being lighter. The insect is readily recognisable in the field by its robust build.

We are indebted to Dr. Cameron for kindly naming the species for us.

Bournemouth,
December 9th, 1927.

CRABRONIDAE IN AN OLD OAK-STUMP, WOLLATON PARK, NOTTINGHAM.

BY HUGH P. JONES.

Unless otherwise stated, the following observations were made between July 15th and August 31st this year (1927).

The tree-stump mentioned is approximately 20 ft. high and 15 ft. round, and stands in a sheltered position, backed by large oaks and beeches, on the edge of a wood, but at some little distance from the trees adjacent. It is entirely dead, and, except for a fairly firm crust (partially bark-covered) on the northern side, is in a condition of touchwood throughout. Since first discovering the stump on August 5th, 1926, I have found it to be inhabited by colonies of the following species of Crabronidae: *Clytochrysus cavifrons* Thoms., *C. chrysostomus* Lep., *Metacrabro quadricinctus* F. (*interruptus* Auct.), *Blepharipus ambiguus* Dhlb. (*gonager* Lep.), *Crossocerus vagarius* Lep., *Physosceles* (*Rhopalum*) *clavipes* L.

The colonies of *C. cavifrons* and *M. quadricinctus* are by far the largest I have yet seen of these two fine Crabronids, and must consist, in each instance, of many hundreds of individuals, the females of both species burrowing peaceably together, side by side, and frequently excavating their nests from a joint entrance hole. This last habit seems most general in those few parts of the trunk where access to the decayed interior is rendered difficult by a covering of dead bark, and shows clearly the amiable relations existing between the two species. As some indication of the extent of the activities within it should be mentioned that beneath one particular communal burrow in constant use by the wasps, and

which is situated in a narrow cavity in the least decayed northern side of the stump, there is a pile of wood-dust 18in. high. Scarcely more than half-a-dozen females of *C. chrysostomus* have been seen at the stump (this species has, in fact, literally been crowded out by its more powerful neighbours) and comparatively few examples of *B. ambiguus* and *Ph. clavipes*. On the other hand, *C. varius* is abundant, although mainly keeping to a portion of the less decayed wood about 10 ft. up the trunk.

Scores of both sexes of this species were in evidence during the last fortnight in July of this year, appearing at times, against the light, like a cloud of gnats about the burrows.

The males of both *C. cavifrons* and *M. quadricinctus* swarmed together about the trunk this summer, first appearing (in twos and threes) on July 15th, and continuing in being, with their respective mates, up to about the third week in August. Odd females, showing little signs of wear, were still conveying prey to the burrows on September 5th—no late date, it is true, as I have met with *M. quadricinctus* females in October. Although no actual pairing was observed, the males were frequently seen 'riding' the females in flight, maintaining a precarious balance chiefly by means of their front tarsi, these being pressed firmly (?) down over their partners' large compound eyes, on either side of, and practically touching, the basal antennal joints. Viewed whilst a pair was at rest, or poised in flight before a burrow, the whole performance appeared distinctly comical, the nervously clutching fore tarsi of the male suggesting reins in the hands of an inexperienced driver.

The many females of *C. cavifrons* observed with prey at the stump seemed, as is usual, to be confining themselves to *Syrphidae*, and then, with one exception (*Melanostoma mellinum* L.), the commoner *Syrphus* species—chiefly *S. corollae* F. *M. quadricinctus* was taken with the following Dipterous prey (eighty per cent of this in July being comprised of the two first mentioned):

Polietes lardaria F., *Calliphora vomitoria* L. (♀♀), *Phormia caerulea* R.-D. (♂♂), *Pseudopyrellia cornicina* F. (1), *Lucilia* sp.? (battered, but apparently *L. caesar* L.), *Alloeostylus simplex* Wied. (♂♂), *Scatophaga stercoraria* L. (one ♀ and numerous ♂♂).

A. simplex was a great favourite in late August, when the 'dung-flies' (*Scatophaga*) were also taken—the last, at least, with their thin, hairy bodies, probably more or less as a makeshift. No flies were seen to be secured from the stump itself, in spite of the large number usually sunning themselves thereon, but many were captured whilst at rest on the surrounding bracken.

It will be noted that no Syrphid is included in the list of prey of *M. quadricinctus*, and indeed, although my experience with the species goes back to 1912 (Shelford, Cambs.) I never once remember taking it with any of this extensive and ubiquitous group of Diptera.* It is really rather remarkable that of two such similarly sized, if not very closely related, Crabronids as *C. cavifrons* and *M. quadricinctus*, both often resting side by side, and making use at times of a common burrow, one (*4-cinctus*) should almost entirely ignore‡ Syrphidae as prey, and the other (*cavifrons*) practically confine itself to them. As possibly having some connection with diet, it may be remarked that *C. cavifrons* is very much less variable in both size and markings than *M. quadricinctus*.

Nat. Hist. Museum, Wollaton Hall, Nottingham.

October 26th, 1927.

SOME NOTES ON THE BIOLOGY OF HUNTING WASPS.

BY W. S. BRISTOWE, B.A., F.Z.S.

The notes which follow are mainly on the biology of the common Pompilid wasp, *Psammochares viaticus* Linn. This wasp hibernates and makes its appearance as a rule in March. It stores each burrow with one big spider, which, in my experience on the heaths at Oxshott and Ripley, is always a member of the family Lycosidae. My records are as follows :—

Trochosa terricola -	40
,, *picta* - -	2
Tarentula barbipes -	4
,, *pulverulenta* -	1

Broadly speaking, it may be said that all these spiders are rather similar in size and appearance, but the ratio in which they are captured does not appear to depend on the abundance of each species in the areas worked, as they are all common both at Oxshott and at Ripley. *Trochosa terricola* lives mainly at the roots of heather; *T. picta* females live mainly in burrows, and it is probably only large females that would be taken, as the average individual of this species does not reach the size attained by the other species; the other species are found more frequently in the open spaces. *P. viaticus* hunts in the heather very assiduously, and this habit may be responsible for the high proportion of *T. terricola* found amongst the prey of this wasp, though it must be

* This does not quite accord with the experience of other Hymenopterists—e.g., A. H. Hamm Biology of Br. Crabronidae,' Trans. Ent. Soc. Lond., 1926.

‡ Although apparently preying on practically any other species of similar size.

admitted that it is difficult to decide whether this is the true explanation, or whether the wasp hunts in the heather because the particular spider of its choice lives there. I revert to this problem later. Suitable spiders are captured when met with in the open, as I have found on two occasions. On one of these I drove a *Trochosa terricola* towards a hunting *Psammochares*. The wasp, in the course of its wanderings, came in contact with the spider. It leapt back, hesitated, then leapt forward again on to the top of the spider. A momentary struggle ensued, in the course of which it was quite impossible to make accurate observations of the exact procedure. My impression was (*a*) that the spider did not even open its jaws in defence, but merely struggled momentarily in an attempt to escape, and (*b*) that the wasp seized a leg and bent its tail round the body to inflict two or three stings on the underside of the spider. The spider collapsed almost immediately, and the wasp stood a short distance away preening itself. After a short pause the wasp approached to make a brief survey of its handiwork; then it seized the spider near the base of one of its legs and, walking backwards itself, started to drag it along. On these occasions the spiders are often dragged considerable distances until a suitable site for a nest is discovered, when the wasp leaves the spider and proceeds to dig its 'grave.' On one occasion, whilst one wasp was burrowing, another discovered the paralyzed spider and, after going through the procedure of stinging it, this second wasp took possession of it. On the completion of the burrow the first wasp came to fetch its prey, only to find it had disappeared. Before finally giving up the search it spent several minutes walking excitedly in circles round the spot where the spider had been left.

When the burrow has been completed the wasp returns to the paralyzed spider, seizes it by a leg and drags it towards the burrow. On reaching a spot an inch or two from the entrance the wasp leaves its prey for a final inspection of the nest and then, after once more seizing it by a leg, it drags the spider after it down the burrow. The burrow may start in a vertical direction, but it is usually inclined at an angle and is about three inches in length, opening out into a chamber at the end. Here the spider is placed dorsal side uppermost with an egg attached, in my experience, invariably to the ventral side of its abdomen. When the egg has been laid the wasp slowly ascends the burrow, throwing down earth with its legs as it goes. On reaching the surface the wasp pulls earth from round about and presses it down with the tip of

its abdomen, and, when the ground is finally levelled, a little lump of earth or a twig is fetched and placed on the site of the burrow to make its situation still more inconspicuous.

On the two occasions I have described above, when spiders have been captured by *Psammochares* in the open, the wasp showed no sign of recognition until actual contact had taken place. In my opinion, which I have expressed more fully elsewhere,* the sense of smell is used very largely by hunting-wasps in capturing their prey. The relative importance of sight and smell varies considerably, though both senses are probably made use of in every case. One might expect those kinds which depend more on sight to have a wider range of prey, but if they still have to undergo a 'smell' test this need not necessarily be the case. One point worthy of notice is the general uniformity in the size of the prey taken by each species, even where the wasp is not particular as to the genus or family of its prey. To inflict a sting which will paralyze and not kill the prey is a delicate operation, and it is probably here that size plays an important part.

Mellinus arvensis Linn. captures flies. With gently vibrating antennae it stalks these on the ground very stealthily and then springs upon them from a distance of about a quarter of an inch, bending it 'tail' round to inflict a sting on the underside of the fly near the junction of the abdomen and thorax, as careful observation has shown me on more than one occasion. Failures are by no means uncommon, and these are probably due to the necessity for gripping the fly in the right position before the sting can be successfully inflicted. On September 10th, 1925, I spent an afternoon at Oxshott watching these wasps hunting their prey on dung, on old pine stumps and on the bare sand. The prey included two Bluebottles (*Calliphora*), one Greenbottle (*Lucilia*), two Flesh-Flies (*Sarcophaga*) and one *Anthomyia*. The colouration of these flies is very different, but they were all common in the area under observation, all belonging to the same Super-Family Muscoidea and, with the exception of *Anthomyia*, which is somewhat smaller, approximately the same as regards size.

Cerceris rybyensis Linn. is another wasp which hunts by sight. These wasps stock their nests with bees. The burrows, which are common in garden paths at Cobham, have their entrances surrounded by loose earth, and at night, when the entrances are closed, they resemble miniature mole-hills. In July, 1927, I dug up two uncompleted nests; one nest contained two female speci-

* 'Solitary wasps and their prey, with special reference to the Mantid hunters;' *Ann. Mag. Nat. Hist.* (9) xvi, pp. 278-284, 1925.

mens of *Halictus calceatus* Kirb.,* one female *H. zonulus* Sm. and one female *H. leucopus* Kirb.; the other nest contained two female *H. calceatus* Kirb., two female *H. leucopus* and one female *H. malachurus* Kirb. In Mr. E. B. Nevinson's collection I have seen this species with the much larger and very different bee *Andrena gwynana* Kirby.

The prey of different British Pompilid wasps is not in all cases restricted to particular genera or even families of spiders; but, since data are lacking as to the localities and dates of capture in the small amount of material available, I will make no attempt at explanation except to suggest that, since each spider has a definite season and distribution, wasps which have a preference for one kind may at different seasons and in different places have recourse to different kinds of prey.‡ In Mr. E. B. Nevinson's collection the prey of *Salius affinis* V. de Lind. comprises one Lycosid, *Trochosa ruricola*, one Drassid, *Drassodes lapidosus*, and one Agelenid, *Agelena labyrinthica*; whilst G. W. and E. G. Peckham record for an American species *Pompilus marginatus*, prey from the families Thomisidae (Crab Spiders), Drassidae (Hunting Spiders), Attidae (Jumping Spiders), Agelenidae (Web-builders) and Lycosidae (Hunting Spiders) ('Wasps, Social and Solitary,' 1905). *Trochosa ruricola* and *Drassodes lapidosus* are both to be found under stones and at the roots of plants, but that *Salius affinis* should capture, in addition to these, a web-builder like *Agelena labyrinthica* is particularly interesting.

Earlier in the present paper I stated that it was difficult to determine whether the high proportion of *Trochosa terricola* amongst the prey of *Psammochares viaticus* was due to the fact that the wasp hunts assiduously amongst heather or that it hunts amongst heather because *Trochosa terricola* is to be found there. Personally I favour the latter view, and it is certain that this wasp, hunting, as I believe it hunts, mainly by smell, will stand a better chance at the roots of herbage than in the open, where the scent would not be so strong. Further, the *Tarentulae* and *Trochosa picta*, which are also included in my list of prey, are more rapid in their movements than *Trochosa terricola*, and it must be borne in mind that *Trochosa picta* has very effective protective colouring. In view of my opinion on the relative value of sight and smell to *Psammochares viaticus*, I must, however, not stress this protective colouration too much, and in passing I may mention

* I am indebted to Mr. O. W. Richards for the identification of the *Halicti*.

† For instances of similar wasps preying on different spiders in different parts of Brazil, see my paper entitled 'Notes on the Habits of Insects and Spiders in Brazil,' *Trans. Ent. Soc. Lond.* 1924, pp. 475–504 (Feb. 1925).

that *Trochosa picta* appears to be the main prey of *P. plumbeus** Fabr., which probably searches it out in its burrow, where protective colouration would be of no advantage.

The condition of spiders captured by *Psammochares viaticus* has received a certain amount of attention. When first paralysed they can, if touched, just move the tips of their legs. If kept in damp surroundings it is rare for any of them to die in less than two weeks, and out of thirty specimens fourteen were still alive in four weeks time, but only one of them eventually recovered (after seven weeks).

On one occasion I put a specimen of *Trochosa terricola* and an example of *Psammochares viaticus* together in a half-inch diameter glass tube. This did not give the wasp room to choose its stinging place or the spider the chance to escape. Although the latter was frequently stung in the encounters which took place, it ultimately triumphed and the wasp was found dead on the following morning.

In the field I have never seen parasitic flies worrying *Psammochares viaticus*, but I bred some Phorid flies of the genus *Aphiochaeta* from some *paralyzed* examples of *Trochosa terricola* which I had kept in damp cotton wool inside a closely fitting tin box.

Cobham, Surrey.
November 5th, 1927.

Longitarsus nigerrimus Gyll. in Dorset.—On October 30th last I found three specimens of this species in *Sphagnum* near Studland. Each specimen was in a different part of the locality, so that it may be inferred that I did not hit upon the headquarters for that district. In September 1926 I found the beetle commonly in a peaty bog near Ringwood, and it was present in the same locality in May of the present year.—P. HARWOOD, 92 Wimborne Road, Bournemouth: *December* 1927.

Coleoptera in the Plymouth District.—This list comprises species taken since my previous note on general captures, in November 1918, in this Magazine, and of other beetles taken previously but not determined at that time. The names starred are, I believe, additions to the county lists.—*Harpalus azureus* F., near mouth of the R. Yealm, x.23; *Ocys 5-striatum* Gyll., Yelverton, v.05, Billacombe, x.19; **Philydrus maritimus* Th., Chelson Meadows, v.24, many; **Aleochara tristis* Gr., Roborough Down, viii.26; *Oxypoda vittata* Maerk., **Zyras funestus* Gr. and **Nototheca confusa* Maerk., with *Lasius fuliginosus*, Chelson Meadows, v.21; *O. induta* M.&R., Bittaford, v.24; **Atheta languida* Er., Chelson Meadows, v.21; **A. tomlini* Joy, Meavy Valley, x.09, Cann Woods, vi.06; **A. malleus* Joy, Slapton Ley, Bittaford, xi.19, Chelson, ix.23; **A. obtusangula* Joy, near Cadover Br., vii.15; **A. puncticeps* Th., Bantham, v.23; **A. corvina* Th., Cann Woods, v.09, Virtuous Lady Mine, x.10, Stoke Bay,

* Two specimens in E. B. Nevinson's collection, one in Cambridge University Collection. In addition L. Berland speaks of *L. perita* (= *Trochosa picta*) as being the prey of this wasp, vide 'Les Araignees de Tatihou,' *Ann. de Zool.* vii, p. 335, 1924.

x.21; *A. *atomaria* Kr., Yelverton, v.08, Chelson, v.22; *A. *inquinula* Er., many, and *A. *nitidicollis* Fairm. (*ignobilis* Shp.), Roborough Down, vii.25; *A. *moptata* Shp., generally distributed and common; *A. *reperta* Shp., once in carrion, Shaugh, ix.15; *A. *cadaverina* Bris., Cad Valley, ix.16; *A. *macrocera* Th., several, and *A. *melanaria* Mann., Roborough Down, vii.23; *A. *subsinuata* Er., Yelverton, vii.05; *Quedius ochripennis* Mén., Shaugh Holt, x.27; *Q. *schatzmayri* Gridelli, Peter Tavy, vii.98, Millbrook (Cornwall), vi.00, Yelverton, vi.06; *Stenus crassus* Steph., Marsh Mills, x.23; *Medon obsoletus* Nord., Millbrook, viii.15; *Haploderus caelatus* Gr., one only, Chelson, viii.26; *Homalium septentrionis* Th., in dead bird, Shaugh, vii.07, Yelverton, vii.25, in carrion trap; my friend, Mr. A. V. Mitchell, also took one specimen at Brixton, ix.17; *Acrolocha sulculus* Steph. (*striatum* Brit. Cat.), Yelverton, vii.25; *Micropeplus porcatus* Pk., one, S. Brent, v.03; *Euplectus karsteni* Reich., Chelson, ix.24; *Bythinus burrelli* Denn., Bittaford, iii.24; *Trichopteryx montandoni* Allib., Walkham Valley, ix.14, in numbers with *Formica rufa*; *Epuraea fuscicollis* Steph., sugar trap, Cad Valley, ix.16; *Acritus punctum* Aubé, Bantham, vii.23; *Monotoma spinicollis* Aubé, Plympton, x.21; *M. 4-dentata* Th. and *Cryptophagus validus* Kr., Chelson, v.21; *C. *fowleri* Joy, Chelson, v.22, in grass trap in runs of *L. *fuliginosus*; *C. *pallidus* Sturm., Yelverton, v.94; *Enicmus histrio* Joy, Yelverton, viii.10; *Corticaria lambiana* Shp., Radford Woods, ii.94; *C. *ferruginea* Marsh., Marsh Mills, vi.25; *Mycetophagus atomarius* F., Chelson Meadow, v.22, the late Mr. G. C. Champion also took it at Budleigh Salterton, vii.18; *Heptaulacus sus* Hbst., one only, Bantham, vii.22; *Trigonogenius globulus* Sol., from a local factory—imported—in great numbers; *Longitarsus* v. *poweri* All., Wembury, x.24; *Trachyphloeus olivieri* Bed., *T. myrmecophilus* Seid., *Cathormiocerus attaphilus* Bris., and *Ceuthorrhynchus euphorbiae* Bris., Wembury, ix.25; *Tychius meliloti* Steph., in numbers, v.22, and *Apion marchicum* Hbst., v.08, Whitsand Bay (Cornwall).—James H. Keys, 7 Whimple Street, Plymouth: *December 14th*, 1927.

Homalota inhabilis Kr. at Loch Garten, Inverness-shire.—During my holiday visit to Nethy Bridge in 1925, I took on September 12th one specimen of this species under the bark of a dead Scots fir tree at the edge of Loch Garten.—T. Hudson Beare, 10 Regent Terrace, Edinburgh: *November 5th*, 1927.

Scydmaenus poweri Fowler in Kent.—After reading the description of the new species *Stenichnus harwoodianus* by Mr. B. S. Williams (*ante*, p. 57), I carefully examined my specimens of the allied species of the genus, and discovered that I had one specimen, standing reversed under *pusillus* Müll., which was undoubtedly *S. poweri*. It was taken in flood-refuse on the south bank of the river Swale (Kent), on April 15th, 1899—a memorable occasion, when, thanks to Commander Walker, who was present, I obtained ten species new to my collection, most of them rarely met with.—T. Hudson Beare: *November 5th*, 1927.

Abundance of Lithocolletis geniculella Reg.—This pretty Tineid, introduced to the British list so recently as 1925 (Ent. Mo. Mag., LXI, p. 193), is prospering exceedingly in its haunts in North Berkshire. During the summer and autumn of 1927 the larvae have been abundant on sycamore (*Acer pseudoplatanus*) at Tubney; on even the smallest bushes, when growing in sheltered spots, their blotches could almost invariably be found. On August 25th the young larvae of the autumn brood were just beginning to feed in large numbers, often several in a leaf, forming whitish mines on the under-side, by the side of fully-formed blotches of the summer brood, some of which had

empty pupa-cases projecting from them. In Bagley Wood, too, the larvae were generally distributed. A specimen of the moth was captured in Wytham Woods on August 21st. On August 27th I noticed several empty blotches, undoubtedly of this species, on sycamore in an Oxfordshire locality—Bladon Heath, near Woodstock. This insect may be expected to turn up in other parts of the country.—E. G. R. WATERS, 184 Woodstock Road, Oxford: *December 4th*, 1927.

Notes on Westmorland Corixidae.—I have read Mr. F. H. Day's paper on the *Corixidae* of Cumberland (E.M.M., LXIII, Oct. 1927, p. 224) with much interest and take this opportunity to add a note on certain species found in Westmorland. *Arctocorisa carinata* Sahlb., *A. germari* Fieb., and *Glaenocorisa cavifrons* Thms., though they seem to be absent from Cumberland, are all recorded from Westmorland (Butler, Biology of the British Hemiptera-Heteroptera, p. 670). Extensive collecting during various spring and summer holidays does not allow me to add any species to Day's exhaustive Cumberland list, but a few miles south of the county boundary all the three above-mentioned insects are to be found. *A. carinata* occurs abundantly in shallow peaty tarns on Dufton Fell at an altitude of over 2,000 feet, and I once took a rather large specimen of *A. germari* among them. The latter species, however, seems more truly at home in a small tarn a few miles each of Appleby, where *G. cavifrons* is also found, though less abundantly. This tarn has a more sandy bottom than the Rundale and Seamore Tarns on Dufton Fell, and lies at the foot of the Fells, at an altitude of under 800 feet. The reason for the absence of these species in Cumberland is probably due to the want of such shallow peaty tarns in the Cumbrian part of the Pennine Range. It must not be supposed, however, that such localities are essential to the species; in Cambridgeshire I have taken *A. germari* and *G. cavifrons* in disused clay and gravel pits with an abundance of Characeae. The only mountain tarn that I have examined in the Lake District—Angle Tarn above Patterdale—has rocky edges with a short stretch of muddy shore at one side, and supported a very meagre insect fauna. The same is probably true of the tarns in the Cumberland part of the Lake District, and I would be much surprised if these insects were found to inhabit any of them.

Butler (*l.c.*, p. 598) and I (Scot. Nat., 1924, p. 24) have described the variation of *G. cavifrons* in Britain, and have pointed out how a large dark form exists in the Highlands of Scotland and Islay, and that specimens from Jura and Westmorland form a series leading to the smaller, paler form of Southern England. Two European species are referred to this genus, viz.: *cavifrons* Thoms. and *propinqua* Fieb. These have been recently discussed by Jaczewski (Ann. Zool. Mus. Pol. Hist. Nat., 1924, III, Z. 1–2, p. 25 et seq.). This author dismisses *propinqua* with the remark that it seems to differ from *cavifrons* only in its paler colour. It is most unlikely that if the pale form of *cavifrons* exists outside Britain it should have been entirely overlooked by Continental Hemipterists, and we may reasonably suppose that *propinqua* refers to this pale southern race.

The two extreme forms are so distinct in appearance that they would be readily mistaken for distinct species superficially, and are certainly entitled to subspecific rank. If my surmise as to *propinqua* is correct we may designate them:— *Glaenocorisa cavifrons cavifrons* Thoms. N. Europe; Scotland.
G. cavifrons propinqua Fieb. Austria; England.

The intermediates from Jura are nearer *cavifrons*, those from Westmorland practically *propinqua*. The case needs further investigation, for the distribution

of the races suggests that they have each entered Britain by separate routes and that later a partial fusion has occurred.—G. E. HUTCHINSON, Dept. of Zoology, University of Witwatersrand, Johannesburg, S. Africa: *October 31st*, 1927.

A new English record of Parasemidalis annae Enderlein (Neuroptera Planipennia).—This insect was introduced as British by the late Dr. C. L. Withycombe (Entomologist, LV, 1922, p. 169) from specimens taken on pines at Oxshott. On 1st August, 1927, I took a female at rest on the stem of a bulrush (*Typha latifolia*) in a small pond in a garden at Shalstone, Bucks. Dr. Withycombe notes that the character separating this species from *P. fuscipennis* Reuter—viz.: that the veinlet between R_1 and Rs ends on Rs and not on R_2+_3—is variable. My specimen is intermediate, the veinlet ending on Rs almost exactly at the point where the latter joins R_2+_3.—O. W. RICHARDS, Imperial College of Science, London, S.W.7: *November 12th*, 1927.

Aculeate Hymenoptera, etc., at Milford-on-Sea, Hants, 1927.—During a short stay at Milford, near Lymington, Hants, from July 1st to 11th, 1927, I found Aculeates particularly abundant, and captured the following amongst commoner species (worn survivors of the spring). They were almost all taken on flowers, etc., on the very edge of the sandy cliffs, frequently in the teeth of a veritable gale.

FOSSORES.—*Sphex (Ammophila) sabulosa* L. (♂♂); *Harpactus tumidus* Pz.; *Nysson dimidiatus* Jur.; *Cerceris arenaria* L. (unusually common, burrowing on the extreme edge of the cliffs); *Oxybelus uniglumis* L.; *Physosceles clavipes* L.; *Thyreopus cribrarius* L.; *Ablepharipus podagricus* V. de L.; *Crossocerus elongatus* V. de L.; *Lindenius albilabris* F. (abundant on paths by the beach).

ANTHOPHILA.—*Saropoda bimaculata* Pz. (♂♂ just appearing); *Megachile maritima* K. (♂♂♀♀); *M. centuncularis* L. (♀♀); *Coelioxys vectis* Curt. (very common; even more so than its host *M. maritima*); *Epeolus notatus* Chr. (*productus* Thoms.), 'parasitic' on *Colletes picistigma* Thoms.; *Nomada rufipes* F. (*solidaginis*), fine large examples occurring with *Andrena nigriceps* K.; *Cilissa tricincta* K. (*leporina* Pz.); *Dasypoda hirtipes* Latr. (fairly common); *Andrena flavipes* Pz. (*fulvicrus*) ♂♂, second brood, both sexes of which were common on a roadside bank at Lymington as early as June 25th; *A. nigriceps* K. (particularly common, the females in the finest condition, appearing as bright as *A. thoracica* F. on the wing); *A. fulvago* Chr. (worn ♀♀) *Halictus leucozonius* Schr. (♀♀); *H. breviceps* Saund. (worn ♀♀); *H. minutissimus* K. (♀♀); *H. morio* F. (♂♂♀♀); *Hyleus (Prosopis) spilota* Frst. (*masoni*); *H. signata* Pz.; *H. hyalinatus* Smith; *Colletes picistigma* Thoms. (♂♂ very common, ♀♀ just appearing on July 10th).

High winds kept Diptera and most other insects away from the cliffs, but the conspicuous beetles *Psilothrix nobilis* Ill. and *Oedemera nobilis* Scop. shared the *Hieracium, Umbelliferae*, etc., with the Aculeates.—HUGH P. JONES, Nat. Hist. Museum, Wollaton Hall, Nottingham: *October 26th*, 1927.

Eumenes coarctata Linn.—Can anyone give me hints on rearing this Aculeate? I have several times found the mud 'pots' on heather, but nothing has ever emerged from them, and they are still intact in my collection.—C. NICHOLSON, 35 The Avenue, Hale End, London, E.4.: *November 13th*, 1927.

Arge metallica Kl., a sawfly new to the British Islands, in Ireland.—On May 22nd, 1927, a female of this beautiful sawfly was captured by me in a clearing in the oak woods about a mile below Clara Bridge, near Rathdrum, Co.

Wicklow. Dr. R. C. L. Perkins, who identified the species, tells me that he knows of no other capture. The species is very distinct from any other of those with a wholly metallic body by the yellow third joint of the antennae, while the ♀ has an entire dark band across the front wings. Enslin gives as localities, France, Germany and Siberia to Kamtschatka.—A. W. Stelfox, Dublin : *December* 1927.

Psocoptera from Merionethshire.—The following species of Psocoptera were taken during the latter end of August last, in the neighbourhood of Barmouth and Dolgelley :—*Clothilla pulsatoria* L., within doors ; *Mesopsocus unipunctatus* Mull. ; *Elipsocus hyalinus* Steph. ; *E. westwoodii* McL. ; *Philotarsus picicornis* Fabr. ; *Amphigerontia bifasciata* Latr. ; *Psocus sexpunctatus* L. ; *Stenopsocus immaculatus* Steph. ; *Graphopsocus cruciatus* L. ; *Caesilius obsoletus* Steph. ; *C. flavidus* Steph. ; *Peripsocus phaeopterus* Steph. ; *Ectopsocus briggsi* McL. I know of no previous records for this district.—J. M. Brown, 176 Carter Knowle Road, Sheffield : *November 14th,* 1927.

Note on the British Species of Lepismatidae.—In his ' Apterygota of the Seychelles ' (Proc. Roy. Ir. Acad., Vol. XXXIII, Sect. B, No. 1, 1916), Dr. Carpenter points out that Escherich's use, in ' Das System der Lepismatiden,' Zoologica, Heft 43, 1905, of the presence of papillae on the apical joint of the labial palpi to separate the Nicoletiinae from the Lepismatinae is not justified as several species of *Acrotelsa* (Lepismatinae) and also of *Lepisma* described by Silvestri possess such papillae.

I have been unable to find any reference to similar organs in our two British Lepismids, *Lepisma saccharina* L. and *Thermobia domestica* Pk. (*T. furnorum* Rovelli.). These papillae are however to be found in both these species and have apparently been previously overlooked. In *L. saccharina* there are the usual five, each on a short base and in two rows close together, three in the front and two in the back row. In *T. domestica* the same number is present but in one row. In both cases they are on the under-side of the joint.—H. Womersley, Sunny Meads, West Town, Somerset : *November 29th,* 1927.

Thermobia domestica Pk. (furnorum Rovelli) in Bristol.—A considerable number of these fire-brats or silver-fish were taken by Mr. A. Kromler at one of the chocolate factories in Bristol during November and sent to me for identification.—H. Womersley.

Obituary.

Emanuel Augustus Newbery was born on February 27th, 1845, in Holborn, where his father conducted the business of a Theological bookseller. When about ten years of age young Newbery was attracted to collecting insects, butterflies and moths in particular ; but specimens of all Orders were acceptable, and many of these early captures, made in Highgate Woods and on Hampstead Heath, were retained and prized by him to the end of his days. A little later experiments in chemistry engaged his attention ; his father encouraged him in this science, and placed him in the chemical class at the London Mechanics' Institute. About this time, too, Newbery improved his education by attending other evening classes. When he was fifteen years of age his father was afflicted with a severe illness, which engaged the constant attention of his mother and himself for many months, and he, being a delicate youth, no doubt contracted that consumptive tendency, from which later on he suffered

for many years. Early in 1861 a medical friend, who had noticed Newbery's intelligent chemical work, expressed the opinion that his vocation obviously lay in that direction, and in due course arranged that he should commence work in the laboratory of a chemical manufacturer of his acquaintance, as soon as a vacancy occurred therein. This did not happen for some months, and meanwhile the father again became ill, and died a few days before the date arranged for his son's entry into the laboratory. Unfortunately his mother was left scantily provided for, as a large portion of her husband's savings had been lost by the failure of the bank in which they were invested. Newbery had therefore to make his start in life under unpropitious circumstances, and his health, two years afterwards, broke down completely through definite tuberculosis. For several years he had to give up all work, and was now completely dependent on his mother, and her son's eventual recovery was due to her constant care. During this period of illness, however, he was not idle. Already he possessed a fair knowledge of music and was an average pianist for his age; he now studied the violin, and his proficiency with this instrument in 1877 obtained for him a place in the orchestra of the Strand Theatre. In 1885 he was appointed Registrar of Marriages for the St. Giles' district, which office he held for twenty-eight years. At the Strand Theatre he met with Christopher G. Hall, a fellow member of the orchestra, and a well-known Coleopterist of his day. The two soon became fast friends, with the result that Newbery decided to specialise in the Coleoptera. For many years he collected assiduously in the London districts, and his annual holiday was usually spent in one or other of the classic hunting grounds for beetles in the country. Eventually he became a recognised authority on the determination of our British Coleoptera. No trouble was considered too great by him in helping his friends to the correct determination of their *incognita*, and there are few British Coleopterists with whom he was not personally acquainted, or with whom he had not corresponded. He was also frequently in touch with the leading Continental Entomologists.

His first contribution to the knowledge of British Coleoptera was published in this Magazine in 1893. From that date onwards he was enabled to add a considerable number of species to the British List; and, what is perhaps of more importance, to delete many names which had no right there. In collaboration with his friend the late W. E. Sharp, he compiled in 1915 an Exchange List, now largely in use, of the Coleoptera of our Islands. Possessing also a good working knowledge of the British Hemiptera-Heteroptera, in 1896 he edited an Exchange List of that Order of insects.

Newbery was a man with an exalted sense of his moral obligations and duties to his fellow man. The misfortunes in his life, the frowns of fate and his many family troubles affected him, therefore, very deeply. As an indication of his sensitive nature, it may be mentioned that a visit to a slaughterhouse when a youth made him a vegetarian for ever afterwards. His last years were extremely sorrowful; on January 30th, 1921, whilst dressing, he fell backwards, injuring his spine; paralysis ensued and he was thenceforth bed-ridden until he peacefully passed away on October 12th of this year. His cabinet and fine collection of British Coleoptera were presented by him to the Cambridge University Museum, and his considerable Entomological library, boxes of duplicates, and foreign collection were disposed of to friends early in his fatal illness.

Mr. Newbery never married.

Stanley Arthur Blenkarn, who died on October 21st, at Purley, Surrey, as the result of a motor-cycle accident on the previous day, was well known to British Coleopterists as an energetic and successful collector, as well as a generous correspondent. He became a Fellow of the Entomological Society in 1921, and was an occasional contributor to the pages of this Magazine. His tragic and untimely death, at the early age of forty-five years, is deeply regretted by a large circle of friends, entomological and otherwise.

Societies

YORKSHIRE NATURALISTS' UNION: Entomological Section.

The annual meeting was held in the Library of the Philosophical Society, Leeds, on October 29th, and was well attended by members from many parts of the County.

Mr. C. A. Cheetham, F.E.S., was voted to the chair. In opening the proceedings he briefly referred to the death of the President, Mr. G. T. Porritt, F.L.S., F.E.S.

The afternoon was devoted to an examination of the many exhibits, and the evening to the reading of reports of the year's work, election of officers, and arranging excursions for the coming year.

Mr. J. M. Brown, F.E.S., was elected President.

The reports of the different committees all agreed in the disappointing results of the year's work, due to continued wet unfavourable weather. In spite of this some notable occurrences were recorded, many of them being exhibited.

In Lepidoptera: *Boletobia fuliginaria* L., at Skelmanthorp; *Deilephila porcellus, D. celerio* L., at Doncaster; *Sphinx convolvuli* L., at Barnsley, Denby Dale and Huddersfield.

In Coleoptera: M. L. Thompson, F.E.S., reported and exhibited *Oxypoda umbrata* Gyll from Glaisdale, *Cantharis darwinianus* taken some years ago at Eston in Cleveland, but only just determined; Mr. Beanland, a case of Lamellicorn beetles from Java.

In Diptera: Mr. C. A. Cheetham, F.E.S., although not having as lengthy a list of noteworthy species as in former years, had met with the following interesting species:—*Boletophila hybrida* Mg., *Drosophila transversa* Fln., *Phronia forcipata* Winn., Grasswoods, 4.vi.27; *Molophilus murinus* Mg., *Rhamphomyia geniculata* (*plumipes* Fln.), Austwick, 6.vi.27; *Cordyla nitidula* Edw., *Tachydromia selecta* Mg., *Geomyza obscurella* Fln., *Hylemyia praepotens* Med., Allerthorpe, 2.vii.27; **Dicranomyia aquosa* Verr., **Orimarga virgo* Zett., *Gonomyia incisurata* Tonn., *Dolichopus laticola* Verr., Sedbergh, 1.viii.27; *Dicranomyia aperta* Lündst., *Goniomyia abbreviata* Lw., Austwick, 4.ix.27.

In Odonata the occurrence of *Cordulegaster annulatus* was reported from Taithes Ghyll, near Sedbergh, Pately Bridge and Keighley.

Mr. G. C. Johnson (Agricultural Research Dept., Leeds University) read an interesting report on injurious insects which had been less troublesome during the year, probably due to the wet season, the carrot fly and carrot aphis being specially noted for their decreased numbers. He exhibited specimens of **Paracoelus apterogyna* Hal., a Braconid new to the County, bred from *Agrotis* sp., and also living specimens, ♂ and ♀, of *Ocypus olens* with eggs laid by the same ♀ and a young larva recently hatched from one of the eggs. Their voracity was demonstrated by offering them mealworms, which they tore readily and quickly devoured.

* New to the County List.

Mr. Hincks exhibited a collection of beetles from the New Forest. Mr. Wood, a collection of beetles from the neighbourhood of Keighley. Mr. Winter, lantern slides of the life-history of *Meloe proscarabaeus* which evoked a discussion as to the host or hosts of this large beetle. Mr. E. G. Bayford, F.E.S., a specimen of *Adalia bipunctata*, with a fly (*Anthomyia* sp.) upon which it was found feeding, and a specimen of the Chrysid *Omalus auratus* L. from Barnsley. Mr. Nash, several cases showing the life-histories of Lepidoptera. The life-like way in which the larvae had been preserved and mounted in natural positions elicited much admiration.—E. G. Bayford, *Hon. Sec.*

Entomological Society of London: *Wednesday, October 19th*, 1927.—Mr. J. E. Collin, President, in the chair.

The following were elected Fellows of the Society:—J. W. Bowhill, Morelands, Grange Loan, Edinburgh; Teiso Esaki, College of Agriculture, Kyushu Imperial University, Fukuoka, Japan; H. J. Falkner, Gyfu, Barton, Torquay.

Mr. E. B. Ashby exhibited and made remarks upon a number of butterflies from Northern Italy. Mr. A. de B. Goodman exhibited four species of *Ascalaphus* from the South of France and Algeria. Mr. L. W. Newman, exhibited a series of *Colias croceus* bred from the var. *helice*. The President exhibited and discussed a number of gynandromorphs and intersexes in Diptera. Professor E. B. Poulton, F.R.S., exhibited and made remarks upon (1) A *niavoides* female of *Papilio dardanus hodsoni*, with tails, taken by H. E. Arnold Hodson, C.M.G., in S.W. Abyssinia. (2) A migratory swarm of *Libythea labdaca* Westw., observed by Lieut. H. Beardmore in Nigeria. (3) Four gynandromorphs of the rare bee *Nomada lathburiana* Kirb., captured by Dr. R. C. L. Perkins, F.R.S. (4) North American Asilid flies and their prey recorded by Stanley W. Bromley. (5) New Zealand Asilid flies and their prey recorded by Dr. J. G. Myers.

Wednesday, November 2nd, 1927.—Mr. J. E. Collin, President, in the chair.

The President announced the death of Mr. D. Pearson, Fellow of the Society.

The following were elected Fellows of the Society:—J. H. Bell, Maiden Lodge, Caterham, Surrey; F. R. Ellaston-Wright, M.D., Braunton, N. Devon; F. G. Hucklesby, 5 Prince's Square, Bayswater, W.2; Capt. H. O. Morgan, 18 Arlington Villas, Clifton, Bristol; R. W. Paine, Asst. Entomologist, Dept. of Agriculture, Suva, Fiji; W. Rees Wright, M.Sc., London School of Hygiene and Tropical Medicine, Endsleigh Gardens, N.W.

Mr. H. J. Turner, on behalf of Mr. W. Fasenidge, exhibited twigs of willow containing the larva of *Synanthedon flaviventris* Stdgr. Dr. J. E. H. Roberts described and discussed methods of preserving colour in dragonflies. Mr. F. W. Edwards exhibited a number of insects taken at sea off the Brazilian coast. Professor E. B. Poulton, F.R.S., exhibited the males of two species of *Amauris*, preserved in papers, in which the scent-brands had been eaten out by pests. He also exhibited and discussed the forms of *Danaida chrysippus* L., collected by Miss M. E. Fountaine in Tenerife and on the west coast of Africa. He also gave an account of mimetic associations of Lepidoptera taken in August 1926 on Kome Island, N.W. Victoria Nyanza, by Mr. and Mrs. W. C. Simmons. Mr. F. W. Edwards gave an account, with lantern illustrations, of a collecting trip to Patagonia and South Chile.

Wednesday, November 16th, 1927.—Mr. J. E. Collin, President, in the chair.

The President announced the death of Professor A. Berlese, Hon. Fellow of the Society, Mr. S. A. Blenkarn, Fellow, and Lt.-Col. J. W. Yerbury, a Special Life Fellow of the Society. A vote of condolence to the relatives of Colonel Yerbury was passed.

The Secretary announced that the Council had nominated the following as Officers and Council for 1928–9 :—President, J. E. Collin; Treasurer, W. G. Sheldon, F.Z.S.; Secretaries: S. A. Neave, M.A., D.Sc., F.Z.S., and N. D. Riley, F.Z.S.; Librarian, H. J. Turner; Other Members of the Council: R. Adkin, P. A. Buxton, M.A., E. A. Cockayne, M.A., M.D., F.R.C.P., H. M. Edelsten, H. Eltringham, M.A., D.Sc., F.Z.S., Capt. A. F. Hemming, C.B.E., F.Z.S., R. W. Lloyd, Prof. R. Stewart MacDougall, M.A., D.Sc., F.R.S.E., G. A. K. Marshall, C.M.G., D.Sc., F.R.S., J. W. Munro, D.Sc., W. H. T. Tams, A. E. Tonge.

The following were elected Fellows of the Society :—J. F. Johnstone, Rutley Lodge, Claygate, Surrey; A. J. Richards, Hazeldene, Hindhead, Surrey; R. C. Wood, Magombwa Estate, P.O. Cholo, Nyasaland.

Mr. H. J. Turner, on behalf of Mr. W. Fassnidge, exhibited a British example of *Myelois cirrigerella* Zk. from Winchester. Dr. E. A. Cockayne, described a prothoracic structure in the larva of *Platypteryx lacertinaria*. Dr. P. A. Buxton exhibited specimens and discussed the resemblance between a Pholcid Spider, a Tipulid, and a Reduviid in Samoa. Mr. R. Adkin exhibited several families of mongrel races or *Diacrisia mendica* Clerck. Brig.-General B. H. Cooke exhibited and discussed some Spanish races of the *Lycaena coridon* group. Professor E. B. Poulton, F.R.S., exhibited specimens and discussed the following :—(1) Mendelian inheritance of a remarkable pale variety of larva in *Abraxas grossulariata;* (2) Pairs of *Danaida chrysippus* L., and of three species of *Acraea,* taken in N. Uganda by Dr. G. D. H. Carpenter; (3) Notes in 1927 on the abundance, proportion of the sexes, and courtship of *Hypolimmas bolina* L. in Fiji, by Mr. H. W. Simmonds; (4) Scent-tufts observed in the males of Costa Ricon Lepidoptera by C. H. Lankester and the late A. G. M. Gillett; (5) An all-female family of *Mylothris apicata* Moschl. from the Cameroons, bred by Miss M. E. Fountaine; (6) An adaptation which tends to prevent inbreeding of certain Lepidoptera. Mr. A. Druitt exhibited varieties of *Epinephele janira* from Ireland. Dr. H. Eltringham described instances of attacks by birds on butterflies.

The following papers were read :—(1) 'British Tachinidae,' by Mr. C. J. Wainwright; (2) 'Two collections of Butterflies from the South-east Corner of the Sudan,' by Dr. G. D. H. Carpenter; (3) 'On the types of Oriental Carabidae described by V. de Motschulsky,' by Mr. H. E. Andrewes.

Wednesday, December 7th, 1927.—Mr. J. E. Collin, President, in the chair.

The Secretary read the nominations of the Council for Officers and Council for 1928–9 for the second time.

Professor Dr. A. Jacobi, Museum für Tierkunde und Volkerkunde, Dresden, Germany, was elected a Fellow of the Society.

Dr. S. A. Neave, on behalf of Mr. H. E. Box, of Tucuman, Argentina, communicated a note on the larva and pupa of *Bungalotis astylos* Cram. Capt. E. B. Purefoy described tests of the ability of the hibernating larvae of *Chrysophanus dispar* to withstand flooding. Mr. E. E. Green exhibited an abnormal pupa of *Pieris brassicae*. Professor E. B. Poulton communicated a note on the luminosity of 'Lanthorn flies' by the late Dr. A. G. Butler, and made remarks on other species of *Laternaria*. He also exhibited examples of butterflies congregating on a damp road in Uganda collected by Mr. B. B. Osmaston, and a very large specimen of *Acraea anacreon* Trimen, taken by the same collector at Cape Town. Mrig.-General B. H. Cooke exhibited a new European Lycaenid, *Cupido arcilacis* Riley. Major R. W. G. Hingston gave an interesting account, with lantern slides, of the remarkable habits of *Oecophylla smaragdina,* the tropical red tree ant.—S. A. Neave, *Hon. Sec.*

OBSERVATIONS ON BRITISH COCCIDAE. XI. WITH DESCRIPTIONS OF NEW SPECIES.

BY E. ERNEST GREEN, F.E.S., F.Z.S.

Phenacoccus balteatus n. sp. (Fig. 1).

Adult female elongate ovate, rounded in front, posteriorly with short but distinct paranal lobes. Colour of living examples pale yellow, with a close covering of white powdery secretion. Margin with a fringe of very short tassels, with a pair of slightly longer tassels at the posterior extremity. Length 2–3.5 mm. Breadth 1–1.75 mm. Average dimensions of 12 specimens 2.83×1.35 mm. Antennae (*a*) 9-jointed, the 2nd joint longest. Eyes conspicuous and heavily chitinized. Labium pointed, its length slightly greater than its breadth at base.

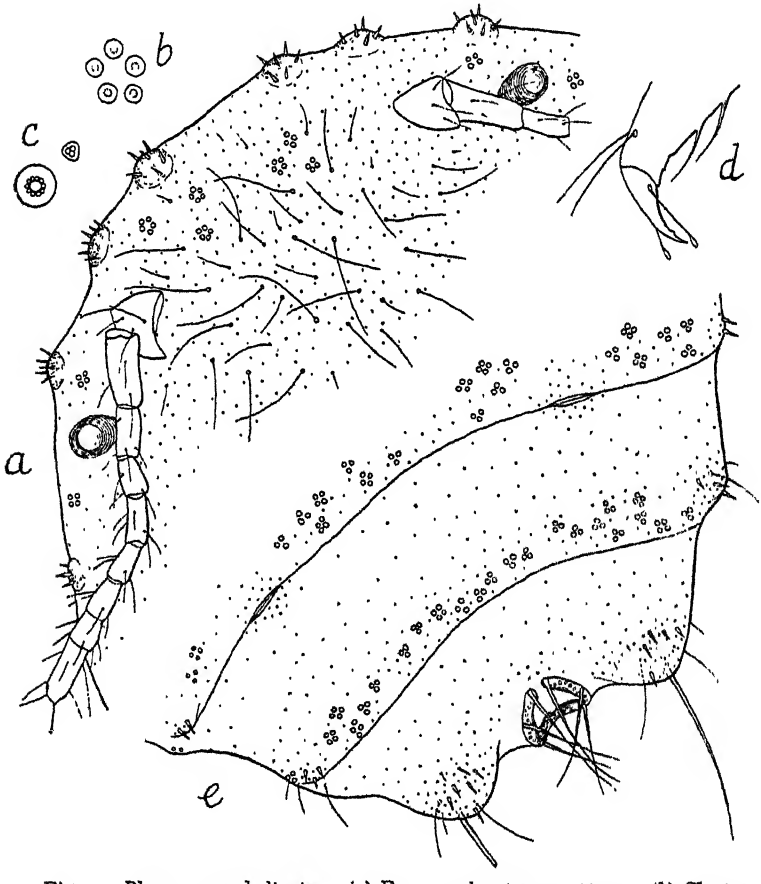


Fig. 1. *Phenacoccus balteatus.* (*a*) Frons and antennae, ×130. (*b*) Cluster of ceriferous pores, ×450. (*c*) Ceriferous pore and trilocular pores, ×840. (*d*) Foot of 3rd leg, ×450. (*e*) Posterior extremity, dorsal aspect, ×130.

Rostral loop short; often scarcely reaching to the base and never extending beyond the middle of the labium. Legs well developed and moderately robust; tarsus less than half the length of the tibiae; claw (*d*) with a conspicuous denticle on the inner edge, near the distal extremity; ungual digitules slender, narrowly dilated distally, extending beyond the apex of the claw; tarsal digitules setiform, simple; coxa of hind limb without conspicuous translucent pores. Caudal setae approximately twice as long as those of the anal ring. Cerarii conspicuous and prominent, those on the frontal area usually more strongly chitinized, forming an unbroken series of 36 (18 on each side); the frontal and paranal cerarii each with from 4 to 6 stout, acute, spiniform setae; the remainder each with 2 (occasionally 3) similar setae. Frontal area (*a*) with many longish trichiform setae; similar but shorter setae occur on the medio-ventral area of the thorax, and form transverse series across the venter of the abdominal segments. Simple discoid pores extend, in crowded series, across the posterior abdominal segments. Other discoid pores, with beaded centres (*b, c*), in clusters of from 3 to 5 pores, are arranged in transverse bands completely encircling each body segment (*e*), with the exception of the ultimate abdominal segment which has none; the larger clusters are more frequent on the frontal area, where they are disposed more irregularly. Micropores, of the usual trilocular type, are distributed over both surfaces of the body and—more closely—on the cerarii.

On the undersurface of the foliage of various grasses, more particularly on *Arrhenatherum elatius*, in association with *Pseudococcus walkeri*, which it somewhat resembled, except that it never exhibited the elongated frontal and caudal tassels so characteristic of *walkeri*. Cheddar Gorge, Somerset; August, 1926.

The insect is fairly active, but not so restless as *walkeri*, nor does it detach itself so readily from its support. Though the two species are difficult to separate in life, a marked difference in colour appears when the insects are immersed in alcohol, the *Phenacoccus* (denuded of its secretionary covering) being pale yellow, while *Ps. walkeri*, under similar conditions, appears of a reddish brown tint.

This species is well characterized by the conspicuous series of grouped pores, which occur in no other known species of *Phenacoccus*.

Phenacoccus nudus Green.

Mr. G. F. Ferris has drawn my attention to the fact that the peculiar characters noted in my description of the species ('Ent. Mo. Mag.,' vol. lxii, p. 172, July, 1926) agree with those for which he erected his genus *Heterococcus* (Leland Stanford Jun. Univ. Pub., Univ. Ser., 1918), distinguishing it from *Phenacoccus* by the presence of 'quinquelocular dorsal pores instead of the usual triangular pores.' My species should, accordingly, be listed as *Heterococcus nudus* (Green).

Trionymus dactylis Green.

This species, hitherto recorded from Guernsey only, was found in some abundance on *Dactylis glomerata,* at Cheddar (August, 1926). It is recognizable by the relatively large size of the limbs, by the possession of from three to four pairs of cerarii, and by the very small, circular, medio-ventral ostiole.

Lecanium hemisphaericum Targ. (Fig. 2).

A study of the limbs of this species reveals the fact that, in the structure of the tibio-tarsal articulation, they resemble that found in (and characteristic of) the genus *Pulvinaria,* as opposed to the conditions occurring in other members of the sub-genus (*Saissetia*) to which this insect has been referred. Free tibio-tarsal articulation, with a heavily chitinized articular tarsal process inter-

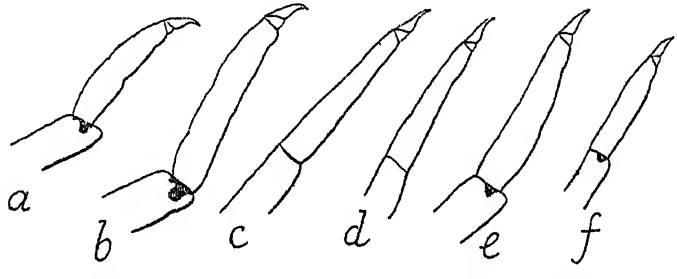


Fig. 2. Tibio-tarsal articulation in *Lecaniinae.* (*a*) *Lec.* (*Saissetia*) *hemisphaericum.* (*b*) *Pulvinaria vitis.* (*c*) *Lec.* (*Saissetia*) *nigrum.* (*d*) *Lec.* (*Eulecanium*) *persicae.* (*e*) *Lec.* (*Coccus*) *longulum.* (*f*) *Lec.* (*Coccus*) *hesperidum.* (All ×450.)

locking with the distal extremity of the tibia, is found in *Pulvinaria vitis* (*b*)—the type of that genus, and this structure is common to all typical examples of the genus. Correlated with this structure is an outward flexure of the tarsus, which is conspicuous in *hemisphaericum* (*a*) also. The only other species of *Lecanium* in which I have observed similar conditions are *caudatum* Green, *gymnosporiae* Green and *muiri* Kotinsky. In sharp contrast with these conditions *L.* (*Saissetia*) *nigrum,* of Nietner, has the tibia and tarsus (*c*) divided by a simple transverse septum: there is no articular process, and the two members are held rigidly together without free articulation. Other species exhibiting this type of structure are *L.* (*Saissetia*) *oleae, L.* (*Eulecanium*) *persicae* (*d*) and *bituberculatum, L. diversipes, L. adersi* and many others. This condition is the most general throughout the genus. An intermediate condition, in which there is a small articular process but

no free movement between the tibia and tarsus, is found in *L.* (*Coccus*) *longulum* (*e*) and *hesperidum* (*f*) and in several closely allied species.

Lecanium persicae Geoff. (Fig. 3).

Nowhere have I seen any notice of a peculiar character to be seen on the larvae of this species. Preparations of what I believe to be the 2nd stage larvae, collected from the foliage of a peach tree in October and again from the stems in March (after hibernation), exhibit four large and conspicuous pores of peculiar con-

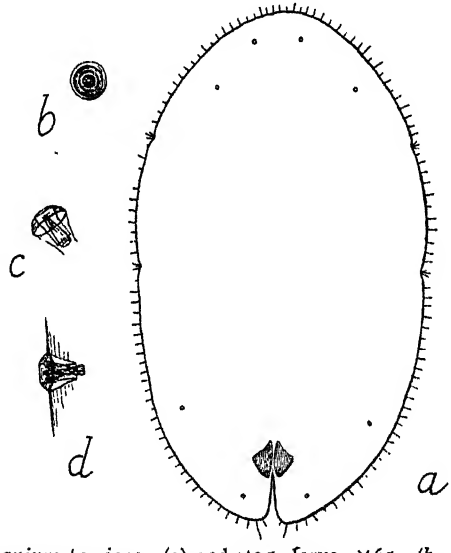


Fig. 3. *Lecanium persicae*. (a) 2nd stage larva, ×65. (*b, c, d*) Dorsal pores of larva, viewed from different angles, ×450.

struction on the frontal extremity and four similar pores on the posterior segments (see fig. 3), with occasionally another pair on the mesothorax. They are dorsal and submarginal in position. I cannot find any trace of such organs on the adult female insect or on the embryonic larvae, nor have I found anything comparable to or homologous with these structures on the larvae of any other species of *Lecanium* that I have examined. Closely similar pores are noticeable on the submarginal area of the adult females of *L. berberidis*, but I have had no opportunity of studying the larvae of that species. It is, presumably, from these tubular pores that the 'long and exceedingly delicate glass-like filaments observed by Newstead on the larvae of *persicae* are produced.

Lecanium transvittatum Green.

A single specimen of this rare species was taken on Aspen (May, 1927), after an interval of ten years since the discovery of the earlier specimens. The present example has an over-all length of 5.5 mm., being distinctly larger than those previously found on Birch. The characteristic colour pattern (which unfortunately fades out in dried material) was well marked on the fresh living insect.

Pulvinaria psidii Mask.

This insect appears, for the first time, on our list of British glass-house species. It was found by Mr. H. Britten, on an unidentified shrub in Rowntree's Tropical House, York. The species has a wide distribution. I have examples from India, Ceylon, Java, Sumatra, New Zealand, the Northern Territory of Australia, the Seychelles, Reunion I., Belgian Congo, Egypt and Brazil. It has also been recorded from China, Japan and Formosa, from California and the Hawaiian Islands. A complete catalogue of its host plants would be still more varied. With such a distribution it is surprising that it has not been introduced into our plant houses before now.

Luzulaspis luzulae Duf.

According to Newstead (Mon. Brit. Cocc., II, p. 30), the eggs of this species 'remain through the winter in the ovisac, the larvae hatching in Spring.' Newly emerged larvae, however, were appearing in my laboratory on October 9th.

Luzulaspis dactylis n. sp. (Fig. 4).

Ovisac white; elongate, stout, convex above; the posterior half distinctly tricarinate; open in front, disclosing the anterior extremity of the female insect. Length 8 mm. Breadth 1.5–2 mm.

Adult female (*a*) elongate ovate; the posterior extremity cleft to the anal operculum. Antennae (*c*) 8-jointed, the 3rd longest, the 7th and 8th shortest; situate approximately half-way between the frontal margin and the bases of the first pair of legs. Limbs robust; tarsus of 3rd leg (*d*) slightly exceeding half the length of the tibiae. Valves of anal operculum rounded at extremity, the outer edge strongly arcuate. Marginal setae (*b*) rigid, acicular, the interval between their bases approximately equal to their length. Stigmatic setae (*e*, e^1, *f*, f^1, f^2) elongate, varying considerably in form, either slender and spirally twisted, or stouter and sinuate, or more or less conspicuously branched. The subfrontal pair of setae approximately twice the length of the acicular marginal setae; a few longer and shorter trichiform setae in the interval between the antennae; a conspicuous medio-ventral group of similar setae on each of the thoracic and abdominal segments. Abdominal segments each with a loose, medio-dorsal group of small multilocular pores. A series of similar pores extends from each spiracle to the margin of the body. Length 3.25 mm. Breadth 1.5 mm.

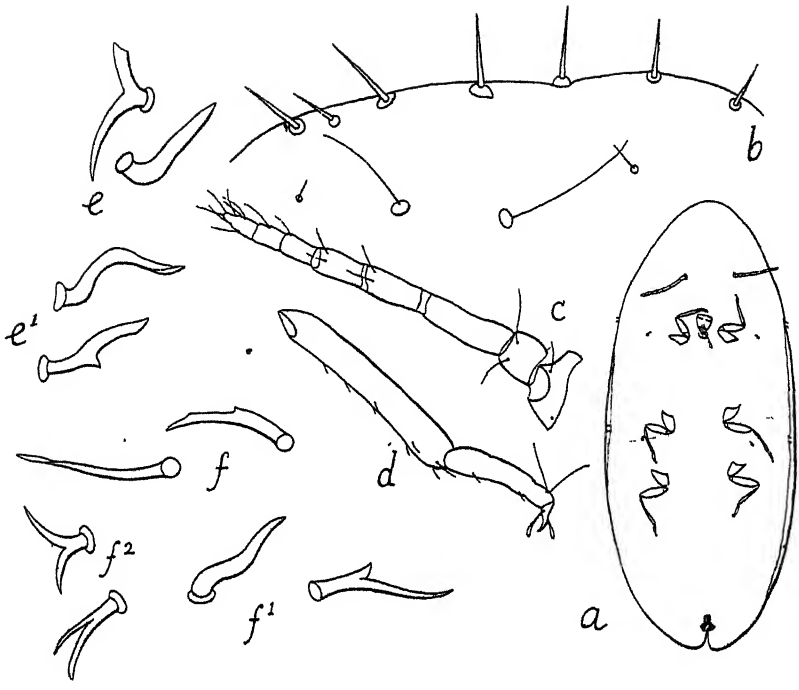


Fig. 4. *Luzulaspis dactylis*. (*a*) Adult ♀, ×18. (*b*) Frontal margin, ×450. (*c*) Antenna, ×130. (*d*) 3rd leg (tibia and tarsus), ×130. (*e*) Anterior stigmatic spines, ×450. (*f*) Posterior stigmatic spines, ×450.

On *Dactylis glomerata*, on the slopes above Cheddar Gorge, viii, 1926.

The ovisacs were attached to the leaves low down on the plant. Material collected at Swanage (Dorset) on an undetermined grass, more than thirty years ago and then assigned doubtfully to *luzulae*, now proves to be identical with the species taken at Cheddar.

Near *L. scotica* Green, with similar aciculate marginal setae, but differing in having the antennae and limbs actually and relatively shorter and stouter. I have seen no tendency in *scotica* to the branching of the stigmatic setae—so noticeable in *dactylis*. The ovisac of this species is conspicuously longer and stouter than that of *scotica* and is further distinguished by being tricarinate posteriorly. Its habitat—on dry hill-sides—is very different from the swampy localities affected by *scotica*.

Luzulaspis frontalis n. sp. (Fig. 5.)

Ovisac white; very long and slender; flattish or moderately convex above;

obscurely tricarinate at the anterior extremity; open in front, disclosing the frontal area of the insect. Length 8–11 mm., the average length being about 10 mm. Width averaging 1.2 mm.

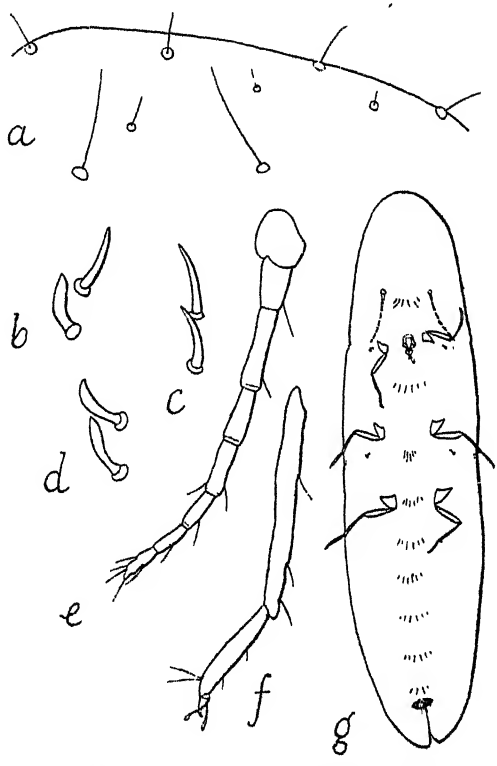


Fig. 5. *Luzulaspis frontalis*. (*a*) Frontal margin, ×450. (*b*, *c*, *d*) Stigmatic spines, ×450. (*e*) Antenna, ×130. (*f*) Tibia and tarsus of 3rd leg. ×130. (*g*) Adult ♀, ×18.

Adult female (*g*) long and narrow, the length equalling or exceeding four times the breadth. Frontal area strongly produced and often radially rugose. Antennae (*e*) 8-jointed, the 3rd longest, the 6th, 7th and 8th shortest and approximately equal; situated at a point very much nearer to the bases of the front legs than to the frontal margin. Limbs slender; tarsus of third leg (*f*) slightly less than half the length of the tibia. Valves and anal operculum bluntly pointed, the extremities irregularly tuberculate. Marginal setae (*a*) slender, trichiform, short; the intervals between their bases twice (or more) as long as the setae themselves. Subfrontal setae more than twice the length of those on the margin. Stigmatic setae (*b*, *c*, *d*) varying in shape, the more usual form being tapering and curved (as at *c*), but a stout dilated form (*d*) is quite frequent. There are conspicuous medio-ventral groups of trichiform setae on each segment. A loose series of small multilocular pores extends from each spiracle to the margin. Length 4–5 mm. Breadth 1–1.25 mm.

Male puparium translucent, glassy, with a frosted surface; the posterior plaque markedly longer than broad. Length 2 mm. Breadth 0.75 mm.

On *Carex remota*, Bearstead (near Maidstone), Kent. This species has been observed, for several consecutive years, in the same restricted area, but not elsewhere. It was at first supposed to be a local form of *luzulae*, until closer study revealed constant differences. *Frontalis* is a very much larger species, being, in fact, approximately twice the size of *luzulae*.

We have now, in this country, four distinct species of *Luzulaspis*. They may be separated by the following key :—

A. Marginal setae trichiform.
   (*a*) Frons strongly produced. Antennae set at a point markedly nearer the bases of the 1st pair of legs than to the frontal margin. Marginal setae widely spaced. Fully developed ovisac averaging 10 mm. long ..... *frontalis.*
   (*b*) Frons not so produced. Antennae at a point approximately midway between the frontal margin and the bases of the 1st pair of legs. Marginal setae narrowly spaced. Fully developed ovisac averaging 5 mm. long .... *luzulae.*

B. Marginal setae acicular.
   (*a*) Antennae and limbs long and slender. Antennae slightly nearer the bases of the 1st pair of legs. Stigmatic setae simple. Adult female approximately three times as long as it is broad. Ovisac not tricarinate ..... *scotica.*
   (*b*) Antennae and limbs shorter and relatively stouter. Antennae approximately midway between frontal margin and 1st pair of legs. Stigmatic setae often branched, contorted or deeply emarginate. Adult female approximately twice as long as it is broad. Ovisac tricarinate posteriorly ..... *dactylis.*

Exaeretopus formiceticola Newst. (Fig. 6.)

This species, hitherto known from the Channel Islands (Guernsey) only, can now be added to the British list of indigenous Coccidae. I collected the ovisacs, sparsely, at the base of plants of *Dactylis glomerata* growing on the slopes above the Cheddar Gorge (Somerset), in August, 1926, and again, under similar conditions, but in greater abundance, at Freshwater (Isle of Wight), in July of the present year—1927. On the earlier occasion most of the insects had, as is their habit, deserted the sacs after completion of oviposition; but a sufficient number of adult females was secured to permit of the exact identification of the species. The specimens collected in the Isle of Wight, three weeks earlier in the season, were still tenanted. The insect at an earlier stage of its development, before the formation of the ovisac, has not yet been observed—either in this country or in Guernsey. A careful search, in late June or early July, should result in the discovery of this missing stage in the life history of the species. It will almost certainly be found adhering to the upper surface of the blades of

the grass, near their junction with the stem—as is the habit of the allied British species, *E. longicornis*. Owing to its retiring habit —concealed amongst the close growing foliage and stalks of the plant—this insect is far from obvious, although the large white ovisacs, when found, are conspicuous objects. The species is probably widely distributed in this country, more particularly along the south coast.

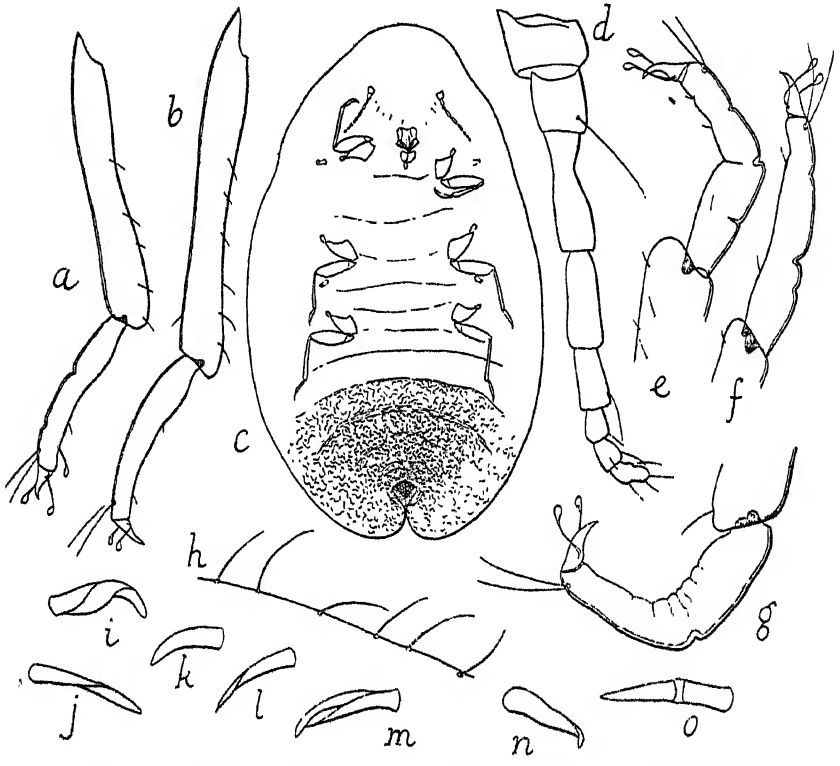


Fig. 6. *Exaeretopus formiceticola*. (*a*) Tibia and tarsus of 3rd leg (Cheddar); (*b*) (I. of Wight), ×130. (*c*) Adult ♀ (example from Cheddar), ×18. Tarsus of 1st leg, (*e*) from Cheddar; (*f*), ex coll., Newstead; (*g*), from I. of Wight, ×220.. (*h*) Marginal setae, ×220. (*i, j, k, l, m, n, o*) Various forms of stigmatic setae, ×450.

The original description of *formiceticola* was drawn up in 1894,* and a new genus—*Exaeretopus*—was erected for its reception, the diagnosis of the new genus being as follows: 'Female adult covered at gestation with a felted sac. Anterior tarsi dimerous. Mentum monomerous. Anal cleft and lobes as in the *Lecaniidae*.' Recent study of ample material has finally convinced

* Ent. Mo. Mag., 2nd ser., Vol. v, p. 204, Sept. 1894.

me that the supposed dimerous condition of the anterior tarsi is based upon a misconception of the structure. There is no true articulation. The deceptive appearance of a septum dividing the joint is due to a more or less deep infolding of the chitinous derm on the inner (ventral) side of the tarsus and is accentuated by a conspicuous indentation at a corresponding point on the outer (dorsal) side of the segment. The infolding of the inner side results in a sharp inward flexure of the distal half of the segment. When, as sometimes occurs, the tarsus is not angled, there is no folding of its inner side. These conditions are shown in the accompanying figures. At (*e*) is an example in which the tarsus is sharply angled medially, with a fold extending almost across the segment; at (*f*) is seen one in which there is no flexure and, consequently, no folding of the inner side; at (*g*) a more gradual bending of the segment has resulted in a series of shorter folds. There are usually two or more minor identations on the outer side of the tarsus. It is noticeable, in all the limbs, that the derm is thicker and more heavily chitinized on the dorsal surface.

Newstead's original description may be supplemented by the following few particulars. In old adult females the posterior half of the abdomen is often heavily chitinized and minutely wrinkled (as at *c*). The third antennal joint is usually constricted at a point a little below its middle (*d*). The limbs are well developed, but I should not describe them as 'very long'; nor is the posterior pair appreciably longer than the intermediate pair. There is an evident slip in Newstead's description of the relative proportions of the tibiae and tarsi. He writes: 'Tibiae not quite so long as the tarsi,' whereas a reverse statement would more accurately describe the actual conditions. From measurements of many examples I find that the tarsi of all the limbs are approximately three-fifths the length of their respective tibiae. I have already expressed my opinion upon the supposed dimerous condition of the anterior tarsi. The marginal setae (*h*) are trichiform, moderately long and stout, and spaced at slightly less than their own length. The body setae are shorter and spiniform, except between the antennae, where there is a conspicuous series of longer trichiform setae. A single stout, specialised setae is usually (but not invariably) present on the margin opposite each of the anterior spiracles, but never on the posterior stigmatic areas. These stigmatic setae are very variable in form, being simple (*k*) or variously folded, twisted or contorted (*i*, *j*, *l*, *m*, *n*). In one instance (*o*) a broad, hyaline band across the middle simulates a dimerous condition.

Eriopeltis festucae Fonsc.

I have received from Miss D. J. Jackson, who collected them in Sutherlandshire, specimens of *E. festucae* exhibiting an unusual arrangement of the ovisacs which, instead of occurring singly, as is usual, are crowded together, in close formation, on a single blade of grass. Moreover these ovisacs are small and less shaggy than in typical examples. No divergence from type can be distinguished in the structure of the associated insects. It may be noted that Dr. F. S. Bodenheimer has recorded a similar massed habit in examples collected in Palestine.

The following observations record either new host-plants or new localities :—

Phenacoccus aceris (Sign), on the stems of Lime trees, and *Lichtensia viburni* Sign, on Ivy, at Arundel (Sussex), May.

Lecanium hesperidum L., on *Laurus nobilis; Lecanopsis formicarum* Newst. and *Ortheziola vejdovskyi* Sulc, at the roots of grasses, at Lewes (Sussex), July.

Eriopeltis festucae, on *Brachypodium sylvaticum; Lichtensia viburni,* on Ivy; *Exaeretopus formeceticola, Luzulaspis dactylis* and *Trionymus dactylis,* on *Dactylis glomerata; Phenacoccus balteatus* and *Pseudococcus walkeri,* on *Arrhenatherum elatius; Parafairmairia gracilis, Trionymus pulverarius, Eriococcus insignis* and *E. greeni,* on various grasses; *Eriococcus inermis,* on *Festuca ovina; Phenacoccus interruptus* and *Ortheziola vejdovskyi,* under moss, at Cheddar (Somerset), August.

Orthezia urticae, on *Potentilla anserina, Ranunculus* sp. and *Vicia* sp.; *Pseudococcus walkeri* and *Eriococcus greeni,* on grasses; *Luzulaspis luzulae,* on *Luzula* sp., and *L. frontalis,* on *Carex remota;* at Bearstead (Kent), September.

Eriococcus greeni was found in extraordinary abundance at Yateley (Hants), in September. From one small spot of not more than three square yards I gathered over a hundred specimens in less than half an hour. They occurred chiefly upon grasses, but ovisacs had been attached also to the withered foliage of various other plants.

Although I have a note of the occurrence of *Lepidosaphes gloveri* (Pack.) on the rind of imported oranges, in December, 1926, I cannot find any published record of its appearance in this country. I have now received further examples, from Mr. H. Britten, of Manchester, where they were observed on orange fruits bought in the market.

Mr. Britten has also sent me another greenhouse novelty—*Pinnaspis marchali* Ckll., from Rowntree's Tropical House, York, where it was infesting *Hibiscus roseus*. The species was originally described from Africa.

Rhizoecus decoratus has been found by Mr. Britten on the roots of a species of *Cyperus* (under glass) at Manchester.

Pseudococcus maritimus was observed, clustered at the base of fruits of edible fig (under glass), at Knaphill, Surrey; July.

Lichtensia viburni was abundant on Ivy at Freshwater, Isle of Wight, in July. Other Coccidae from the same locality were: *Eriococcus pseudinsignis* Green, on grass; *Parafairmairia gracilis*, abundant on *Carex vulpina*; and *Exaeretopus formiceticola*, on *Dactylis glomerata*.

An unfortunate erratum occurred in my previous article (Ent. Mo. Mag., July 1926), where, on p. 117 (line 10 from below), for 'dorsal' read 'ventral.'

Ways End, Camberley, Surrey.
November 23rd, 1927.

Inhabitants of Processionary Caterpillar nests.—During a stay in April 1924 at Mimizan-des-Bains, a small place in the Landes district of France and about a hundred miles north of Biarritz, I opened a few of the nests of the Processionary Caterpillar (*Thaumatopoca pityocampa* Schiff.) which were abundant there.

The fauna of these nests appeared to be very constant:

(1) *Parasites:* Tachinid flies parasitize the caterpillars, and pupae of these flies were very abundant. Examination shows that a high percentage of the Tachinid pupae were themselves parasitized by a Chalcid. A number of these hyper-parasites were bred and Mr. J. Waterston of the British Museum tells me they are typical forms of the variable species *Dibrachys boucheanus* Ratz.

(2) *Scavengers:* Two species of beetle were common in every nest opened; both have been identified by Dr. Hugh Scott. One was a Dermestid, *Dermestes aurichalceus* Küst., the other was a Cryptophagid, *Micrambe perrisi* Bris. (*abietis* Perris *nec* Payk.). Earwigs and Trombidiid mites were also present.

(3) *Predators:* Spiders were numerous in every nest. These were an interesting variety of the Clubionid, *Clubiona decora*, which is a common species in France and found occasionally in Great Britain. Males were adult, but the females were still immature. What constitutes the food of these spiders it is difficult to say. They are probably too small to overcome the Tachinid flies, so their diet would appear to be one of beetles (with mites and chalcids as doubtful possibilities, since spiders do not seem to like either as a general rule). I do not think they have chosen this habitat merely for purposes of shelter and protection.—W. S. Bristowe, Ashford House, Cobham, Surrey: *November 5th*, 1927.

COLEOPHORA ALBIDELLA H.-S. A DISTINCT SPECIES.

BY E. G. R. WATERS, M.A., F.E.S.

In Vol. lxiii of this Magazine, pp. 100-1, I recorded *Coleophora albidella* H.-S. as a species occurring in the Oxford district, on the strength of larval cases found in Waterperry Wood (Oxon) and at Cothill (Berks). Wishing to obtain reliable examples of the perfect insect, in May 1927 I searched systematically for the larvae in these two localities, and met with unexpected success. In Waterperry Wood three larvae or larval cases were obtained on May 8th, and about two dozen (including twelve on one low bush) on May 15th; at Cothill seventeen larval cases were collected on May 22nd within an area of a few square yards. All the cases were on *Salix cinerea*, nearly all on the upper side of leaves, which the larvae were often skeletonizing; none were on *Salix Caprea*, though this species of sallow is nearly as common as *S. cinerea* in the Waterperry Wood locality. From these batches of larvae and cases twenty moths were bred, nineteen of which emerged between June 9th and 22nd, and the twentieth on June 28th. With this material it is now possible to determine more accurately the differences between *C. albidella* and the closely-related *C. anatipennella* Hb.

The separation of *albidella* from *anatipennella* is justified by certain features of both the larval and the imaginal stages. The differences, which are not all equally convincing, but are conclusive when taken in conjunction, may be summarised as follows:—

(*a*) FOOD-PLANT. *Anatipennella* habitually feeds on *Rosaceae* (*Prunus* and *Crataegus*, sometimes also *Pyrus*), *albidella* on *Salix*. Records of the finding of the larvae on other food-plants, such as hazel, lime, oak, birch, etc., must be regarded as exceptional, and are doubtless due in many instances to confusion with other species such as *C. ardeipennella* Scott and perhaps *C. ibipennella* Stt. This difference of habit creates a strong presumption that they are distinct species. So far as my knowledge goes, there is no species of *Coleophora* whose larvae feed habitually on both *Rosaceae* and *Salicaceae*.

(*b*) LARVA. The differences in the larvae are not very marked. L. Sorhagen, who devoted a short paper to *C. albidella* in the 'Illustrierte Zeitschrift für Entomologie,' V (1900), pp. 113-4, certainly went too far in denying the presence of lateral spots on the second and third segments of the larvae of *albidella*. In May 1927 I had full-grown larvae of both *albidella* and *anatipennella* before me, and the lateral spots were clearly visible in both. The only important difference noted was that in *anatipennella* the four triangular dark-brown dorsal markings on the second segment

were less sharply defined, and connected by dark clouding; but this is a point in which variation may easily occur.

(*c*) LARVAL CASE. The fully-formed case of *albidella*, when compared with that of *anatipennella*, appears swollen ventrally in the middle (not tapering gradually towards the base), is of a dull black colour (not somewhat shining), and is roughly coated on the back and sides with small leaf-fragments, which always include a large proportion of whitish down (never present in *anatipennella*). The lateral scaly flaps are decidedly smaller in *albidella*, and placed nearer the anal end; while I have never seen them widely expanded, as in many examples of *anatipennella*. To anyone familiar with these cases in the field, the differences will seem more than sufficient to justify specific separation, in a genus where the form and colour of the larval case are so constant and so characteristic. The larva of *anatipennella* often betrays its presence among the leaves and twigs by the glistening of its case in the sunshine; with *albidella* this is never so. The difference in the methods by which the larvae enlarge their cases was explained (with figures) by Sorhagen in the paper already mentioned. The presence of white down on the cases is independent of the plant on which the larvae feed. Sorhagen found that *anatipennella* cases remained smooth, even when the larvae were fed on plants with downy leaves (sallow and *Prunus Padus*); while Mr. O. W. Richards found a larva of *albidella*, in its usual down-coated case, feeding on birch in Bagley Wood (Berks) on May 12th, 1927, and reared a female moth from it on June 16th.

(*d*) IMAGO. The perfect insects, which are of the same size and general appearance, cannot be discriminated without close examination. In *albidella* the tips of the costal cilia of the forewings are always white or creamy, but this occurs also in *anatipennella*. The darker scales sprinkled on the forewings (mainly the outer half) vary in *albidella* from light ochreous to fuscous, sometimes being almost absent, but when present usually numerous and suffused; in *anatipennella* they are of a darker fuscous and more sharply defined, but a larger supply of bred specimens is needed before this can be certified as a specific characteristic. For the present the best superficial distinction is to be found in the antennae. Herrich-Schäffer, in his original description of *albidella*, described the antennae as faintly ringed underneath only; this is very often, but not invariably, true. The annulations of the antennae are certainly fainter in *albidella*, and commonly reduced to spots on the under side, the antennae in consequence appearing plain white from above; whereas *anatipennella* has complete and conspicuous

darker rings. Occasionally the annulations are complete even in *albidella*, but they are never so dark and distinct as in *anatipennella*.

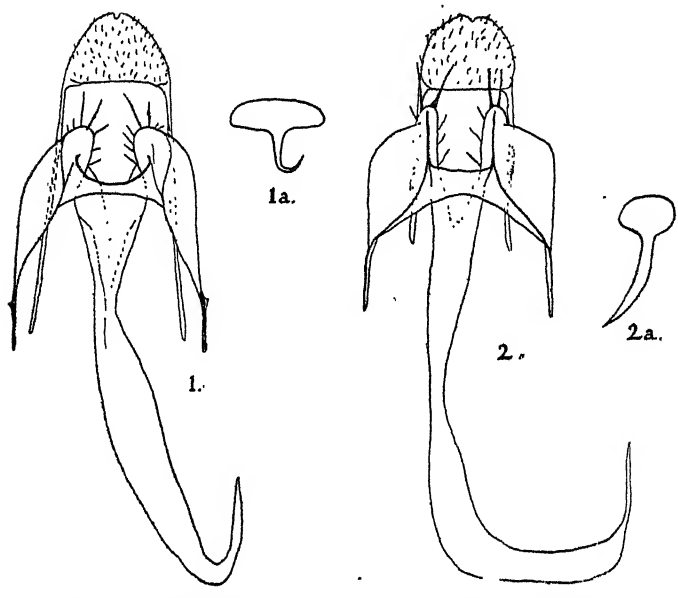


Fig. 1. *C. albidella* H.-S., ♀, ventral view; 1*a*. Signum.
Fig. 2. *C. anatipennella* Hb., ♀, ventral view; 2*a*. Signum.

(*e*) GENITALIA. The accompanying figures by Mr. O. W. Richards, to whom I am greatly indebted for the trouble he has taken, show clear differences in the female genitalia, especially in the shape of the signum. Mr. Richards adds that there are small differences in the male genitalia also, especially in the internal apical angle of the harpe, which is more serrate in *albidella* than in *anatipennella*.

Albidella is probably quite as common as *anatipennella*. In my own short series of captured imagines hitherto classed as *anatipennella* I find several—from Milford (Surrey), Boar's Hill (Berks) and Oxford—which must be transferred to *albidella*. Mr. E. Meyrick has specimens bred from sallow from Monks Wood (Hunts) and from the Marlborough (Wilts) district. The specimens placed under the name *anatipennella* in the British collection at South Kensington, unfortunately without adequate data, are mostly *albidella*.

184 Woodstock Road, Oxford.
December 27th, 1927.

ON CERTAIN PALAEARCTIC SPECIES OF *NOTONECTA* LINN.

BY G. EVELYN HUTCHINSON, B.A., F.E.S.

1. *Notonecta maculata* var. *fulva* (Fuente).

In a recent paper (Bull. Soc. Hist. Nat. d'Afrique du Nord, xvii, pp. 237-247, 1926) Poisson has described an interesting new species of *Notonecta* from North Africa under the name of *N. pallidula*. At the end of his discussion he states that Delcourt had no doubt observed this species among specimens of *N. maculata* Fab., but had passed them by as immature or as albinic specimens of the latter species. In a subsequent paper (Ann. Mag. Nat. Hist., ser. 9, xix, p. 375) I pointed out that the specimens of *N. maculata* with immaculate elytra mentioned by Delcourt (Bull. Sc. Fr. Belg., xliii, ser. 7, i, p. 373 *et seq.*) as occurring in S. Europe and N. Africa are referable to *fulva* Fuente, originally described as a variety of *glauca* Linn. This paper was written without knowledge of the work of my valued correspondent M. Poisson, and on receiving a reprint of his paper it seemed advisable to re-investigate the matter in case any confusion between *fulva* and *pallidula* had occurred. I have therefore re-examined the two specimens of *fulva* in my collection, one from Naples (G.E.H.), the other from Gabes, Southern Tunisia (J. Omer-Cooper). These specimens are undoubtedly referable to *maculata*, differing from *pallidula* in their larger size (15.0 mm. and 13.5 mm. respectively), in the uniformly black scutellum and in the form of the eyes. Unfortunately both specimens are females. There is no doubt, therefore, that both *N. maculata* var. *fulva* (Fuente) and *N. pallidula* Poiss. may co-exist in the Palaearctic list.

2. *N. viridis mediterranea*, n.n.

= *N. v. meridionalis* Hutchinson l.c.

nec *N. furcata* var. *meridionalis* Poisson l.c.

As was pointed out to me by Mr. W. E. China, my sub-specific name *meridionalis* cannot stand, being preoccupied varietally in the genus. The specimens of *N. viridis* recorded by Poisson (Bull. Soc. Ent. Fr., 1925, p. 328) from Angora must belong to this subspecies.

3. *N. lutea* Müll.

The ♂ genitalia of this alone among European species remains undescribed. Having had occasion to examine these structures in as many species as possible in order to sub-divide the genus, I take this opportunity of figuring the capsule and clasper of this and the next species. *N. lutea* has the 'digitiform appendage'

characteristic of the ventral region of the other European species. The capsule of the specimen figured, from Tenbach, Austria (9. ix. 1922, G.E.H.) is slightly damaged anteriorly, so the outline of the drawing in front of the appendage may be a little inexact. The length of the capsule is 2.8 mm. (figs. 1 and 2).

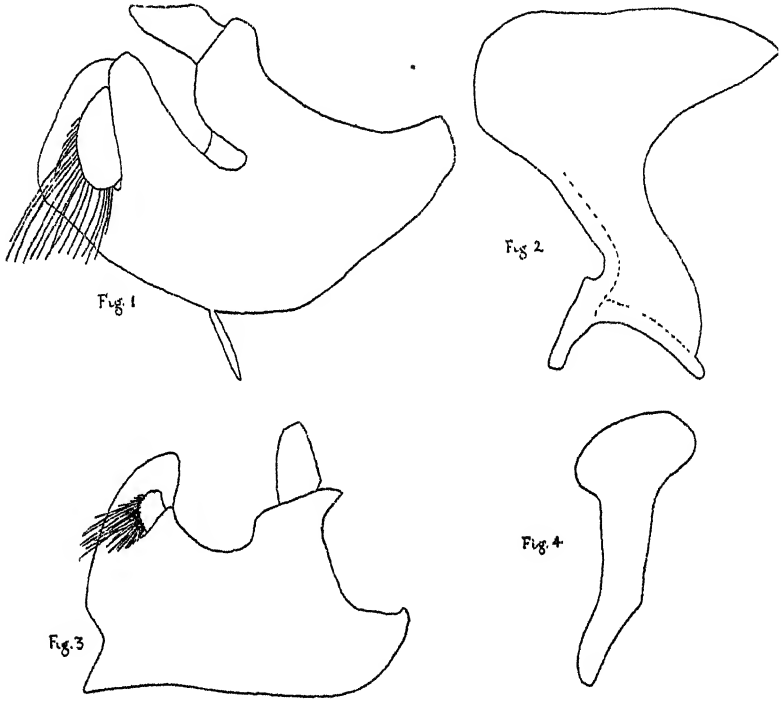


Fig. 1. *Notonecta lutea* Müll. ♂ genital capsule (×21).

Fig. 2. *Notonecta lutea* Müll. clasper (×67).

Fig. 3. *Notonecta triguttata* Motsch. ♂ genital capsule (×21).

Fig. 4. *Notonecta triguttata* Motsch. clasper (×67).

[In figs. 1 and 3 hairs on capsule are omitted, in figs. 2 and 4 all hairs omitted.]

4. *N. triguttata* Motsch.

The only Asiatic species in which the genitalia have been described is *N. suensoni* Hungerford (Ann. Ent. Soc. Am., 1925, xviii, p. 417, later synonymised by its describer with *N. bergrothi* Esaki). No mention is made of a digitiform appendage. In *N. triguttata* there is likewise no appendage, but the ventral margin

of the capsule is produced posteriorly as a pointed triangular unjointed process. The length of the capsule figured, from a specimen merely labelled 'Japan,' is 1.9 mm. (figs. 3 and 4).

Dept. of Zoology, University of Witwatersrand,
Johannesberg, S.A.
December 3rd, 1927.

OBSERVATIONS AND RECORDS FOR SOME THYSANOPTERA FROM GREAT BRITAIN. I. WITH A DESCRIPTION OF *ODONTOTHRIPS CYTISI* SP. N.

BY GUY D. MORISON, B.SC. (LOND.),
North of Scotland College of Agriculture, Aberdeen, N.B.

The European species of the genus *Odontothrips* are in need of revision, and I hope that Mr. Bagnall will find time to do this with his unique collection of Thysanoptera. Priesner, in writing 'Die Thysanopteren Europas,' was hampered by not having types of the British species, especially as the genus is founded on *O. ulicis* Hal.-Bagn., hitherto recorded solely from the British Isles and France.

Odontothrips ulicis Hal.-Bagn.

After comparing some of Bagnall's specimens with mine, I accept his determination of Haliday's species because: (1) I have found both sexes of the insect in great numbers on *Ulex europaeus* in S. England and N.E. Scotland and in lesser numbers on *U. nanus* in S. England. (2) Its pale yellow nymphs occur in the flowers of *U. europaeus*. (3) It answers to Haliday's original description except that it has no hooks on the fore tarsus, and for this I accept Bagnall's explanation that Haliday was mistaken in describing as hooks on the tarsus what were really the apices of the claws on the tibia. The remark about the fore tarsal hooks applies equally to *phaleratus* Hal., but not to *loti* (described elsewhere by Haliday), which has a pair of hooks on the second segment of the fore tarsus.

The species seems univoltine. Nymphs frequent the flowers of *U. europaeus* and the results of their injury appear as a silvery sheen on the inside of the petals and on the staminal sheath, but only superficial cells are damaged, and this seems of no importance to the plant. Evidently the mature nymphs pass to the earth to complete their metamorphosis, and presumably the greater number of them hibernate as nymphs; but some imagines probably survive the winter, for I found at Peterhead, Aberdeenshire, on January 1st, 1925, in a gorse flower an active ♀ and ♂ when the tempera-

ture was many degrees below freezing and a thin film of ice covered most of the plant. Also I have found them more or less commonly during January—September, but in greatest abundance during March—June. I can record them from Burnham Beeches, Bucks, Bagshot, Berks, Kew Gardens, Surrey, and in a number of localities in Aberdeenshire and Kincardineshire. Gorse seems their host plant, but I have also found them on *Cytisus scoparius, Lotus corniculatus* (one ♀) and *Larix europea* (one ♀). When they are beaten on to a sheet of paper from gorse they are often captured and eaten by small Arachnids from the same source, and I once obtained a ♀ with an immature mite attached by its jaws to the base of her abdomen on the ventral surface. Abnormalities occur chiefly in antennal segments 3—6 either by fusion or reduction. In order to settle the classification specimens will be sent to most Thysanopterists.

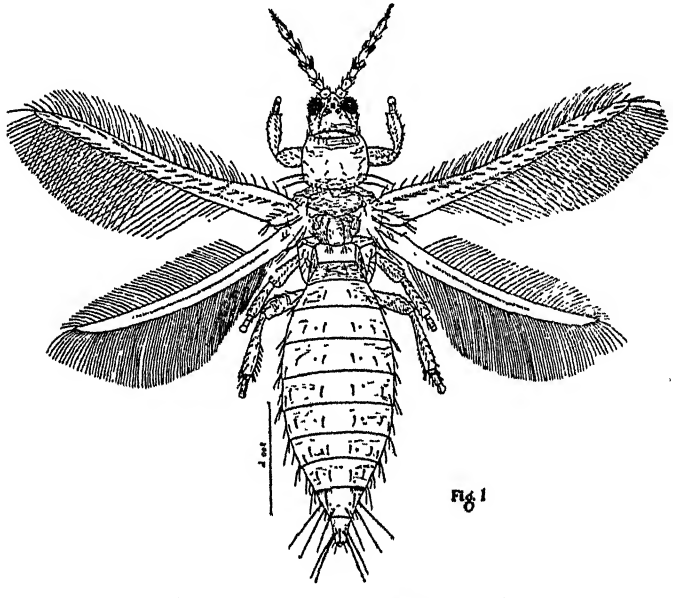


Fig. 1. *Odontothrips cytisi* sp. n. ♀.

Odontothrips cytisi, sp. n.

Female (figs. 1 2). General body colour dark brown, sometimes with a slight reddish tinge. Legs and antennae coloured like body except the third antennal segment, all tarsi, fore tibiae towards apex, and ovipositor blades which are yellowish brown. Fore wings dark brown except for a very pale area just beyond the base and a light brown area between the middle and the apex. Hind wings very pale brown with darker longitudinal vein and a small dark area near the base. All hairs dark brown.

Measurements in μ: Antennal segments, length : with, I 32-35 : 37, II 46-49 : 29, III 66-72 : 29, IV 64-70 : 26-28, V 47-49 : 22-23, VI 62-64 : 25-26, VII 11·5 : 8·5, VIII 20 : 7·5; total length of antenna, about 370; head, length 138-150, width 168-180; interocellar hair length about 96; length : width, maxillary palp segments I 20 : 10, II 20 : 7, III 24 : 5, labial palp I 3 : 7, II 20 : 4. Pronotum, length 192-210, width 228-264; length of hairs on anterior angles of pronotum 32-35, on posterior angles 96-108; claws on fore tibiae, length : width at base, external claw 26 : 12, internal claw 15 : 9. Mesonotum, length 90-120, width of mesothorax 330-360; metanotum, length 150-180; fore wings, length 950-1050, width near base, 138, near middle 78; hind wings, length 840-950, width at middle 60; hind tibia, length 210-240. Abdomen, length 1000-1150, width 380-420; length of 'comb' teeth of urotergum VIII 9-17, of longest hairs of IX 190-200, of longest hairs of X 180; ovipositor, length in straight line 330, width across middle of a blade 58. Total body length 1400-1600.

Head broader than long, marked with distinct dark transverse striae and with the margin of the foramen magnum dark and strongly chitinised. Cheeks very slightly curved outwards from the parallel. Each eye about $\frac{1}{2}$ the length of the head and about $\frac{3}{4}$ as wide as long, projecting slightly and the internal margin rounded; very dark reddish brown in colour with moderately large facets and pilosity limited to about 12 hairs. Ocelli conspicuous, with the anterior ocellus more closely approximated to the posterior than these are to one another; each posterior ocellus separated by about the length of its lens from the compound eye; ocellar pigment dark reddish brown forming crescents towards the centre of the ocellar triangle. The two pairs of ante-ocellar hairs are quite conspicuous, the interocellars are very long and a row of 6 stout hairs is placed across the head on either side behind the eyes, and besides these there are a few exceedingly delicate hairs scattered about the occiput. On each side of the ventral surface of the head there is a hair near the base of the antenna, a row of 4 hairs near the eye, 3 hairs between the eye and the mouth-cone and 1 hair just above the mouth-cone and another above it nearer the middle line.

Mouth-cone about as long as head and reaching to about middle of the prosternum, then bent abruptly downwards; same colour of the head except for a small dark area at the apex; extrusible portions of the stylets, maxillary and labial palpi pale brown; 4 colourless hairs at the apex of the last segment of the maxillary palp and 3 on that of the labial palp and a few dark hairs scattered about the mouth-cone.

Antennae 8-segmented, inserted in front below the vertex of the head and closely approximated. Segments: I wider than and almost rectangular in outline but with a base somewhat wider than the apex on which is placed a minute, dorsal process directed forwards; II barrel-shaped, but more constricted just past the base which is in the form of a strongly chitinised ring; III urn-shaped, with a distinct pedicel on which rests the rounded base of the urn which is almost parallel-sided for $\frac{2}{3}$ of its length (up to the base of the long hairs) where it becomes constricted and continues with closer parallels for the remaining $\frac{1}{3}$ of its length. This segment is almost symmetrical in side view, but with a slightly greater dorsal bulge behind the forked trichome. IV shaped like III but with a shorter, wider pedicel, a narrower body, a less abrupt constriction for the terminal $\frac{1}{3}$, and in side view more asymetrical due to the ventral bulge behind the forked trichome. V shaped like II but much narrower and with a short pedicel and a slight ventral bulge. VI elongate-ovoid, with a broad base and an apex a little wider than VII which has sides almost parallel but slightly converging towards VIII, which is similar to VII but longer and narrower and ending

in a fairly blunt apex. Segments I-VI are marked with faint transverse striae. A forked, curved trichome (38μ) is present on the dorsal surface of III just posterior to the apex, and another is similarly placed on the ventral surface of IV. A single, small (9μ), hooked trichome is placed on the outer side, a little below the apex of IV, V, VI, whilst VI bears a large, blade-like trichome (30μ) on its inner side. I bears 10 short hairs, II 7 longer hairs, III 4 long and 1 short, IV-V each 5 long, VI 6 shorter, VII 4 hairs, VIII 3 long hairs at the tip and 3 lower down. III-VI bears 3-5 transverse rings of exceedingly delicate microtrichia. I dark brown, slightly darker at apex, II same colour, but little paler yellowish brown towards apex, III yellowish brown, darker towards apex and darker dorsally than ventrally, IV-VIII dark brown, IV and V with a paler ring just above the pedicel, VI with a very slightly paler ring just above the base and a similar colour towards the apex, VII, VIII coloured brown like the apex of VI.

Pronotum broader than long; posterior angles rounded. At each anterior angle there are 2 short hairs, one below the other and directly cephalad. Along the anterior margin lie 8 hairs, whilst about 16 are scattered about the pronotum, and 8 lie along the posterior margin between the two pairs of long hairs at the posterior angles. It is marked by delicate transverse striae like the rest of the body including the legs.

Mesothorax with its anterior angles rounded and a stiff hair near each postero-lateral angle of the mesoscutum. Mesosternum with a row of 3 hairs just in front of each coxa and about 20 usually smaller, scattered hairs. Few small hairs scattered on the pleurites.

Metathorax: metascutum with 1 long and 1 short hair at the anterior margin on either side of the median longitudinal line; metascutellum hairless; meta-epimeron (the sclerite between the metasternum and the metascutellum) with 2 hairs; metasternum bears about 20 short, scattered hairs and 1 long hair in front of each coxa.

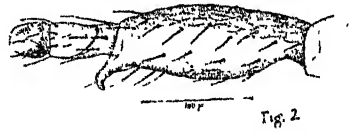


Fig. 2.

Fig. 2. Outer lateral view of left fore tibia and tarsus of *Odontothrips cytisi* sp. n. ♀.

Legs: fore femur dorso-ventrally expanded; fore tibia cylindrical with a narrow base expanding to about three times this diameter in the middle, then contracting slightly before the apex. Two strong, curved claws at the apex; the outer ventral is larger than the inner ventral claw and each bears a small pale hair near its apex. The gland near the apex of the fore tibia is usually visible entad. Fore tarsus without hooks. Two strong hairs at the apex of the middle and hind tibiae, and the hind tibia bears a comb of 6 stiff hairs along its inner ventral margin. All coxae, femora, tibiae and tarsi bear a few small hairs which tend to become longer towards the apices of the femora and tibiae. The legs tend to be slightly darker brown than the rest of the body, but the yellowish brown colour of the axis and apex of the fore tibiae and of the tarsi is sometimes seen in a slight degree at the apices and bases of the middle and hind femora and tibiae.

Wings: fore wing, costa with 26 hairs; radial vein with 4+11—17+2 hairs

with very little spacing between the groups unless the middle group is small, in which case the spacing between it and the last group is fairly long; cubital with 14-18 hairs; anal with 5 hairs, 2 (colourless) near the apex and 1 dark near the base of the anal area. Of cross veins there is one between the radial and the costal at about the level of the 7th costal hair, another at about the level of the 16th costal hair, and another between the radial and cubital vein at about the level of the 2nd cubital hair. Owing to the method of mounting, the veins are often invisible except those marked by hairs. About 30 fringing hairs lie between hairs 5-22 of the costa, and about 40+28 fringing hairs lie along the posterior margin of the wing from a little way past the alula to near the apex. Hind wing with about 40 fringing hairs along the anterior margin for the last $\frac{3}{4}$ of its length, and about 70 along its posterior margin. There are 2+1 small hairs at the base of the anterior margin, 2 colourless, stiff hairs on the middle vein near its base, and 2 long and 4 minute hairs at the apex of the alula which is the darkest coloured area of the whole wing. The anterior fringing hairs of the front wing are paler brown than those of the hind wing. The posterior fringing hairs of both wings are waved. Both wings are covered with very small, dark microtrichia in parallel longitudinal lines.

Abdomen of elongate-ovoid shape common in genus. Uroterga 2-8 and urosterna 1-7 have each a chitinised and more or less darkened transverse, narrow band at or near their anterior margins. Urotergum 1 is more sculptured than the rest and bears 6 hairs. Each of uroterga 2-7 bears a mid transverse row of 6 hairs and 2 lateral hairs at each side. Urotergum 8 has the chaetotaxy of 2-7, but on either side with an extra hair, a 'comb' of about 12 teeth dorso-laterally placed on the posterior margin, and a group of about 15 teeth like those of the comb (*i.e.* integumental, hair-like processes without an articulated base) in front of the spiracle. The two combs are separated dorsally by about the length of a comb. Tergum 9 bears 26 hairs of which 6 are extra long. Tergum 10 bears 14 hairs of which 4 are extra long, and it is split for more than $\frac{1}{3}$ its length along the mid dorsal line. Urosternum 1 is reduced and bears 3 minute hairs. 2 bears 4 hairs along its posterior margin and 3–7 bears 6 hairs. Urosternum 8 is split into two triangular plates each with 5 hairs along the posterior margin. A pleuron of 1 is a small dark chitinous rod surrounded by membranous chitin. On segments 2-7 each pleuron is divided into a dorsal and a ventral pleurite. The ventral pleurites are deeply dentate along their posterior margins, whilst dorsal pleurites 3-7 bears each a hair near the posterior margin. The length of the abdominal hairs tends to increase towards the posterior segments. Each urotergum bears 4 sensory (?) or glandular (?) areas—one between the first and second hair from the middle line and one near each anterior angle. A similar row of 4 areas is present across the dorsal surface of both meso- and metathorax. The areas have the appearance of alveoli of hairs. A reddish brown, spherical, accessory (?) gland lies at the base of the ovipositor and is conspicuous in young insects. Spiracles as usual on the mesothorax, metathorax, 1st and 8th abdominal segments open into a well-developed tracheal system.

Male (fig. 3). Like the female, but smaller, and the general body colour tends to be lighter, and when so the yellowish brown areas of the antennal and leg segments are more conspicuous. The two upturned processes of the 9th urotergum are dark brown tipped with black. The extrusible portions of the genitalia are yellowish brown. In young, light coloured specimens the testes and vasa deferentia are orange coloured and lie in abdominal segments 4-6, whilst a very large median, paler coloured sac (accessory gland ?) lies in segments 5-8, but these organs may be very inconspicuous in older, darker specimens.

Measurements in μ: Antennal segments, length : width, I 29-32 : 32-35, II 43·5-46 : 26, III 58-68 : 23, IV 58-63 : 23, V 40·6-45 : 20, VI 58-63 : 22, VII 8·5-11·5 : 8·5, VIII 14·5-17·5 : 6; total length of antenna, about 350; head, length 120-145, width 150-162; interocellar hair, length 72-78. Prothorax, length 145-168, width 203-226; length of hairs on anterior angles of pronotum 27-30, on posterior angles 80-87; claws on fore tibia, length : width at base, external claw 17 : 11, internal claw 14 : 8. Mesonotum, length 87-100, width of mesothorax 246-305; metanotum, length 119-148; fore wings, length 810-920, width near base 102-116, near middle 65-70; hind wings, length 750-900, width at middle 50-58; hind tibia, length 210-252. Abdomen, length 320-395, width 116-145; length of 'comb' teeth of urotergum VIII, 5-11, of longest hairs of IX, 145-160; length : width at base of dorsal processes of urotergum IX, about 38 · 17. Total body length 1100-1320.

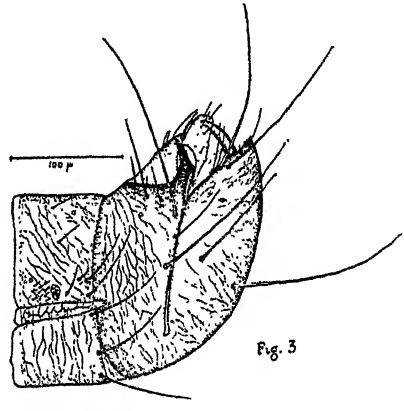


Fig. 3. Left lateral view of end of abdomen of *Odontothrips cytisi* sp. n. ♂.

On either side of abdominal segment 8 there is a small pleuron dentate caudad. Each postero-lateral angle of urotergum 9 is produced upwards in a strong curved process which seems to function as an accessory copulatory organ. A colourless, curved hair arises just behind the process at its base.

Described from eighty females and sixty males caught during the years 1924—1927 on *Cytisus scoparius* in Aberdeenshire and Kincardineshire. Type specimens consisting of ten females and ten males have been deposited in the British Museum (Nat. Hist.) and co-types will be sent to most Thysanopterists.

Of the known European *Odontothrips* the species *cytisi* resembles most closely *ulicis* Hal., but the female may be separated by the usually shorter lengths of antennal segments 3—6, the usually smaller number of stiff hairs on the forewings, the shorter hind tibia and the decidedly shorter claws on the fore tibia. The male, besides having the specific characters of the female, is very clearly distinguished by the two upturned processes of the ninth urotergum, though in this character it resembles *meridionalis* Priesner.

As usual, deformities occur chiefly in antennal segments 3—6, some of which may be reduced or fused in different ways; also the number of hairs on the radial and cubital veins of the fore wings may be inconstant to the number of 2—3 per vein on either wing.

As seen in the body of the female, the mature egg is slightly reniform, measuring about 300 : 120. Usually about three eggs mature together. Presumably they are laid in the gynoecea of flowers of *Cytisus scoparius*. During the weather usually experienced in this district these flowers become open to the visits of Thysanoptera for about three days previous to their opening for larger insect, and then they last about seven days. I have found nymphs often in numbers in the flowers from the middle of June to the end of July with the first stadium nymphs predominating during the earlier month. The second stadium nymphs are large and of variable but pale yellow, though when alive they are usually darker than those of *ulicis* Hal. They do not seem to have as sure a foothold as the imagines. As many as three will occur on the inside of a flower which shows on the inside of its petals and on its staminal sheath the silvery appearance usually attributed to damage by Thysanoptera. Such petals, if fixed and stained, will show a greater intensity of staining in the injured areas. However, as the imagines of other species of Thysanoptera often feed on the flowers, the nymphs of *cytisi* cannot be accused of all the damage, and in any case the total injury caused by Thysanoptera does not seem to affect the plant adversely.

The species seems univoltine. Full-grown nymphs evidently pass from the plant to the earth, where apparently they complete their metamorphosis, appearing the following year as adults. Most of the adults I have found in the spring are certainly young individuals, but this does not preclude the possibility of the hibernation of some adults of the previous year. Since during the last four years I have found the nymphs only on *Cytisus scoparius*, it seems that this plant is the normal host, but in spring, when the adults appear, I have taken them in numbers on grass, *Anemone Nemorosa* and *Vaccinium Myrtillus*, and more frequently during the later months on *Ulex europaeus*. I have found adults from the beginning of April to the end of July in Aberdeenshire and Kincardineshire. Males and females occur usually in about equal numbers and sometimes hundreds may be present on a large bush of broom before the flowers open, though only few adults are found on bushes in full bloom. They are rather slow in movement, but the temperature of a hot day makes them quite brisk. In the field the white patch at the base of the wings is quite conspicuous.

Odontothrips phaleratus Hal.

During the last four years I have caught ♀♀, ♂♂ and nymphs commonly in Aberdeenshire and Kincardineshire on *Lathyrus pratensis*. Adults were found from the beginning of June to the end of August, and nymphs during July and August. The adults appear regularly in the same spot shortly before *Lathyrus* is about to flower, and whilst many hundreds may be present in a bed of *Lathyrus* they do not seem to spread to neighbouring plants, though these are separated by only a few yards. Only once have I found ♀♀ on *Vicia Cracca*.

Odontothrips loti Hal.

During June-July of the last four years I have caught ♀♀ and few ♂♂ on *Lotus corniculatus* in various parts of Aberdeenshire and Kincardineshire. The insects seem restricted to small patches of *Lotus*, which is very common in many districts; nor have I found them on *Lotus major* in the North or South of Great Britain.

Odontothrips mutabilis Bagn. (nec *meridionalis* Priesner).

I obtained this species on October 6th, 1923, from flowering *Ulex nanus* at Burnham Beeches, Bucks., and my field note is that they were numerous and active; but I only took five ♀♀, of which three were ovigerous. A ♀ was taken on *U. nanus* at Oxshott, Surrey, on September 5th, 1927.

In a recent conversation Bagnall informed me of the above error in synonymy, and I believe that he is publishing that statement shortly. Through his kindness I have two ♀♀ caught by him during September, 1924. However, his original description is too comparative to be satisfactory, so I add the following brief diagnosis of my specimens, which, I think, will allow the two species to be separated fairly easily, though they are apparently almost identical in coloration.

Measurements in μ: Antennal segments, length : width, I 26-29 : 35, II 43 : 29, III 73 : 29, IV 67-72 : 26, V 43-46 : 26, VI 61-63 : 23; VII 11-6 : 6, VIII 17·5 : 6-7; head, length 140-145, width 170-180; interocellar hair, lengths 80-87; length : width, maxillary palp segments I 23 : 8·5, II 15 : 5·8, III 15 : 3·5; labial I 3 : 6, II 20 : 2·5. Pronotum, length 160-174, width 230-246; length of hairs on anterior angles of pronotum 30-40, hairs on posterior angles 85-110; fore tibial claw, length 8·5, width at base 8·5; hooks on second segment of fore tarsus, length 5. Pterothorax, length 246-260, width 305-320; fore wings, length 960-1020; hind wings, length 900-960; hind tibia, length 203-232. Abdomen, length about 930, width about 330; length 15-18 of each of about 12 teeth in each 'comb' of urotergum VIII; longest hairs on urotergum IX 130-170, on X 145-155. Total body length 1450-1580.

The chaetotaxy varies in the fore wings: costa 27-32, radial vein 4-5+12—18 +2, cubital vein 14-17.

(?) *Odontothrips ignobilis* Bagn.

At Bagshot during August, 1923, on *Ulex nanus* were obtained two ♀♀, two ♂♂, which apparently belonged to this species, hitherto recorded only from Spain with no mention of a plant. Owing to the evaporation of the alcohol in the collecting tube the insects became very shrivelled and were unfortunately destroyed.

Department of Advisory Entomology,
Marischal College, Aberdeen, N.B.
January 1928.

Crabronidae in Wollaton Park, Notts: a correction.—In my note in the January number of this Magazine, 'Crabronidae in an old oak-stump, Wollaton Park, Notts', two printer's errors have occurred—one of which may not be too obvious. On page 5 a capital G has mysteriously crept in between the *v* and *a* of *varius*, and on p. 7, in the sentence commencing 'It is really rather remarkable that of two such similarly sized . . . Crabronids as *C. cavifrons* and *M. quadricinctus*,' both often resting side by side,' when 'nesting side by side' was of course intended.—H. P. Jones, 53 Owston Drive, Wollaton Park, Nottingham: *January 9th*, 1928.

Atemeles paradoxus var. acuticollis Wasm., a variety new to the British List.—Seven specimens of this variety were taken by me between the 13th and 19th of April, 1927, at the Lizard, Cornwall, in various nests of *Formica fusca* var. *glebaria*. Wasmann described the var. *acuticollis* of *A. paradoxus* in the Deutsch. Ent. Zeit., **31**, 102 (1887) as follows:—'Thorace lateribus penes angulos posticos fortius emarginatis, angulis acutioribus.' In his table, in German, he separates it from the type by the sides of the thorax more strongly bordered, and the posterior angles distinctly more pointed and standing out. I have to thank Mr. H. St. J. K. Donisthorpe for kindly determining the identity of the beetle, and also for furnishing me with the above descriptions.—J. H. Keys, 7 Whimple Street, Plymouth: *December 30th*, 1927.

A note on Peronea shepherdana Steph.—This Tortricid, though locally plentiful in the Fens of Norfolk, Suffolk and Cambridgeshire, has been reported from few other British localities. There are isolated records of its occurrence at Lytham in Lancashire (bred some seventy years ago by J. B. Hodgkinson; *cf.* Wilkinson's 'British Tortrices,' p. 151), at Hitchin in Hertfordshire (taken by Mr. Durrant; *cf.* Victoria History of Hertfordshire, Vol. I), and at Reading in Berkshire (taken at light by the late Mrs. Bazett; *cf.* Victoria History of Berkshire, Vol. I). Mr. Meyrick (in the 1895 edition of his 'Handbook') mentions also Dorset, and Barrett added Essex and East Lothian, but in each case without any details. I suspect this species to be much more general than the records indicate. *P. shepherdana* is common enough in certain marshy spots in the Oxford district—at South Hinksey (Berks), where I first met with it in 1919–20, and at Cothill (Berks), where I have found it since 1923. In Oxford-

shire I have taken a specimen at Yarnton (September 2nd, 1924). On August 31st, 1926, I captured two specimens in the marsh at Freshwater, in the Isle of Wight. There are probably two reasons why this species is overlooked. The first is the unobtrusiveness of its habits, already pointed out by Barrett. The moths hide by day among dense tangles of *Spiraea Ulmaria* near the ground; if disturbed by the opening out of one tangle, they usually dive into another, and thus often escape capture. It is doubtless due to constant rubbing against leaves and stems that the condition of captured specimens is usually so indifferent. The second reason is the Lateness of the imago's appearance. According to Meyrick and Barrett the moth is on the wing in July and August; this is no doubt correct for some localities, but in my experience *P. shepherdana* is decidedly an autumnal insect. Near Oxford I have never been able to find the moth until late August, the earliest date being August 29th, 1910. It occurs throughout September, so long as the weather is favourable; and at Cothill I obtained a specimen in very fair condition, and probably sighted another, as late as October 4th, 1927. *P. shepherdana* should therefore be looked for, in late August and during September, in any meadows or marshy places where meadow-sweet grows plentifully and undisturbed. Some care is needed in separating it from *P. aspersana* Hb., which sometimes has strongly reticulated forewings, frequents *Spiraea Ulmaria* in the same localities, and is still on the wing in the first half of September; a glance at the hindwings, which are faintly reticulated in *shepherdana* but not in *aspersana*, is usually decisive.—E. G. R. Waters, 184 Woodstock Road, Oxford: *January 2nd*, 1928.

Note on Hyponomeuta cognatella Hübn. feeding on the Honey-dew of Aphis rumicis Linn.—While I was carrying out experiments recently in England on the oviposition responses of moths of the genus *Hyponomeuta*, some observations on the feeding habits of the adult moths were made which seem worth recording. Numbers of *H. cognatella* Hübn. were confined in cages and supplied with shoots of *Euonymus europaeus* and *E. japonicus* for egg-laying purposes. It was noticed that two or three moths were always to be seen on certain shoots which happened to be infested with *Aphis rumicis*. Elsewhere in the cages the moths would remain motionless, but on these shoots they were always active, moving about in an agitated manner with proboscis fully extended, prodding at the *Aphis*-infested leaves. From the random way in which they appeared to be working I imagined that they were feeding upon the Aphid honey-dew deposited upon the leaves. More careful observation showed that this was not the case. Whenever an aphid was touched by the proboscis it was seen that a drop of honey-dew was secreted and this was immediately sucked up by the moth, which, during the process, ceased its active movements, remaining quite still as if to enjoy the taste to the full. Curiously enough the moths do not seem to stroke the aphids intentionally but poke about on the shoots at random as if blind, but when they do happen to touch an aphid they immediately seize upon the drop produced and drink it greedily. I am not aware that any similar habit has been definitely recorded in any British moth although the occurrence may be more general than is usually supposed. Dr. Hugh Scott has drawn my attention to the description quoted by Bingham in the 'Fauna of British India,' Butterflies, Vol. II, 1907, p. 298? (and the illustration there given), of the Lycaenid *Allotinus horsfieldi* Moore tickling Aphides with its proboscis. This butterfly seems habitually to feed on honey-dew and its fore legs are specially modified, perhaps for stroking the aphids.—W. H. Thorpe, Citrus Experiment Station, Riverside, California: *December 11th*, 1927.

Crabro carbonarius Dahlb. in Lancashire.—I have just identified a male of this species which I took on Holker Mosses on June 6th, 1922. It was flying about a thick broken-off branch of, I think, a spruce fir, which I was watching, as it was being visited by *Rhyssa persuasoria*. The only British records of *C. carbonarius* appear to be two examples from Aviemore, Scotland (Ent. Mo. Mag., 1900, p. 227, and 1904, p. 62).—J. DAVIS WARD, Lynehurst, Grange-over-Sands, Lancs.: *December 29th*, 1927.

OBSERVATIONS ON *COLEOPHORA CAESPITITIELLA* Z. AND *C. GLAUCICOLELLA* WOOD.

BY E. G. R. WATERS, M.A., F.E.S.

In spite of their extreme abundance *Coleophora caespititiella* Z. and *C. glaucicolella* Wood are imperfectly known, and few lepidopterists have made a systematic attempt to separate them. The other rush-feeding *Coleophorae*, though obscure, can be discriminated by careful breeding; but these two species cannot be distinguished with certainty by any superficial characters of the larval or imaginal stages. It is true that the moorland form of *caespititiella*, attached to *Juncus squarrosus*, can usually be determined without difficulty owing to its dark colour and its habitat (*cf.* Dr. J. H. Wood, in Ent. Mo. Mag., XXVIII, 1892, p. 170); I have bred this form in plenty from South-west Surrey, and have seen the larvae commonly on the mountains of North Wales and the Lake District. But the ordinary form of *caespititiella* does not differ perceptibly in colour or markings from *glaucicolella*. According to Dr. Wood (*ibid*, p. 173), followed by Mr. Meyrick in his Handbook, *glaucicolella* is a paler-looking and more decidedly ochreous insect, and has dark apical dashes more constantly than *caespititiella*; but though I have long series of each before me, I find it impossible to accept this distinction even as a vague general rule. Grey specimens which I have thought to be probably *caespititiella* have repeatedly proved on examination to be *glaucicolella*. The genitalia alone (male and female) separate the species with certainty. The female genitalia of both species were adequately figured by Dr. Wood, in connection with the paper referred to above (plate 4, facing p. 176); the male genitalia are figured here for the first time, from drawings by Mr. O. W. Richards. It is thanks to the kindness of Mr. Richards, who has taken the trouble to identify a large number of specimens by examining the genitalia, that I am able to write the present notes.

It was rightly pointed out by Dr. Wood that the *Juncus*-feeding *Coleophorae* are not confined to one particular species of *Juncus*, though each has a preference. *Caespititiella* undoubtedly prefers *Juncus communis* and *J. squarrosus*, on both of which it abounds.

An attempt to find specific distinctions in the genitalia of the dark *Juncus squarrosus* form was unsuccessful, though it is very probable that this form is an incipient species. *Caespititiella* is also widespread, though less plentiful, on *Juncus articulatus* and *J. inflexus* (*glaucus*). In 1925 I bred a series of *Coleophorae* from larvae in plain silken cases, found on November 22nd, 1924, on *Juncus articulatus* near Shabbington Wood (Bucks); out of eight specimens (bred on various dates) whose genitalia were examined, three were *caespititiella*, the others *glaucicolella*. From a batch of Coleophorid larvae on *Juncus inflexus*, collected on October 17th, 1926, in a river meadow at Kennington (Berks), nearly a hundred moths were bred the following summer, eight of which proved to be *caespititiella*, the rest *glaucicolella*. Similarly *glaucicolella* is by no means restricted to its favourite food-plant, *Juncus inflexus*. In 1925 I bred specimens from larvae found on *Juncus communis** in South-west Surrey. Its occurrence on *Juncus articulatus* has already been mentioned. In salt-marshes the larva is common on *Juncus Gerardi*, along with *Coleophora adjunctella* Hodgk.; examples of *glaucicolella* were bred in the summer of 1927 from larvae found on that plant at Yarmouth in the Isle of Wight. Further observations regarding food-plants, especially by entomologists who have access to the more local species of *Juncus*, are desirable.

The times when these two insects occur in the perfect state have not hitherto been worked out in detail. *Caespititiella* definitely belongs to the earlier part of the summer, from May to the first half of July. Larvae from Ockley Common (Surrey), feeding on *Juncus squarrosus*, produced moths between May 27th and June 8th, 1924. Larvae from near Shabbington Wood, feeding on *Juncus articulatus*, produced *caespititiella* on June 2nd, 11th and 18th, 1925. Mr. Richards records a male specimen from Boar's Hill (Berks), bred from *Juncus effusus* on June 20th, 1924. The eight specimens, mentioned above, from *Juncus inflexus* at Kennington, emerged on May 31st, June 5th, 9th, 17th, 18th, 20th, 25th and 29th, 1927; that on June 5th was a male, the rest were females. The normal time when the moths are first seen on the wing in the Oxford district is about a week before the end of May; but in favourable seasons and localities they may be met with earlier. Mr. Richards has supplied me with the exceptionally early record

* Under this comprehensive name I venture to include both *Juncus conglomeratus* and *J. effusus*, with apologies to any botanist who may regard me as a 'lumper.' Coleophorid larvae which feed on the one form will always feed with equal readiness on the other, and it is often impracticable to separate the two when collecting larvae in the field. Even *C. agrammella* Wood, which Dr. Wood thought to have a preference for *J. conglomeratus*, is equally common near Oxford on *J. effusus*.

of a male and female *caespititiella* captured near Stanton St. John (Oxon) on May 7th, 1921. It is possible, in fact probable, that emergence begins later and is completed earlier in captivity than in the open. Although I keep the larvae out of doors and in conditions as nearly natural as possible (on stems of *Juncus* planted in flower pots, the earth being kept moist), they are necessarily much more sheltered, in a walled-in garden and surrounded by gauze, than in some of their natural habitats. In the open *caespititiella* may be met with until the middle of July; thus my own specimens include one captured, in good condition, near Shabbington Wood on July 1st, 1925, and another taken near Martinhoe (N. Devon) on July 10th, 1924, while Mr. Richards has one which he captured at Oxshott (Surrey) on July 13th, 1924.

Glaucicolella is on the wing from mid-May to late August, attaining its maximum in July and early August. Specimens bred from *Juncus communis*, from South-west Surrey, emerged on July 7th and 10th, 1925. Of the series bred from *Juncus articulatus*, from near Shabbington Wood, the earliest example determined as *glaucicolella* appeared on June 30th, and many others emerged in the following month, down to July 30th. Those from the Yarmouth salt-marsh, bred from *Juncus Gerardi*, began to appear as early as May 18th, 1927, and continued until August 3rd; out of fourteen specimens bred, four emerged in May, two in June, seven in July, and one in August. The batch of larvae from Kennington, feeding on *Juncus inflexus*, gave particularly instructive results owing to the large number of moths bred. The first *glaucicolella*, a female, emerged on June 1st, 1927, a day after the first *caespititiella*. During June *glaucicolella* emerged very sparingly, ten specimens in all (six males and four females, all examined by Mr. Richards). From the beginning of July emergence quickened, forty moths appearing between July 1st and 15th, about thirty between July 16th and 31st, and seven between August 1st and 6th, when they stopped rather abruptly. It is possible that a few others, not included in the above figures, may have escaped at the time when large numbers were emerging. Of these later specimens (from July 1st onwards) twenty-eight have been determined by Mr. Richards, including many from the first half of July, when overlapping with *caespititiella* might be expected; from the fact that none of these twenty-eight proved to be *caespititiella* (two freaks with imperfectly developed genitalia, bred on July 6th and 13th, were not determinable with certainty) we may conclude that the July and August

specimens are all *glaucicolella*.[2] In the open *glaucicolella* occurs equally early, and it remains on the wing during most of August. Mr. Richards obtained males and females, flying among *Juncus inflexus*, near Kirtlington (Oxon) on May 20th, 1927, as well as a

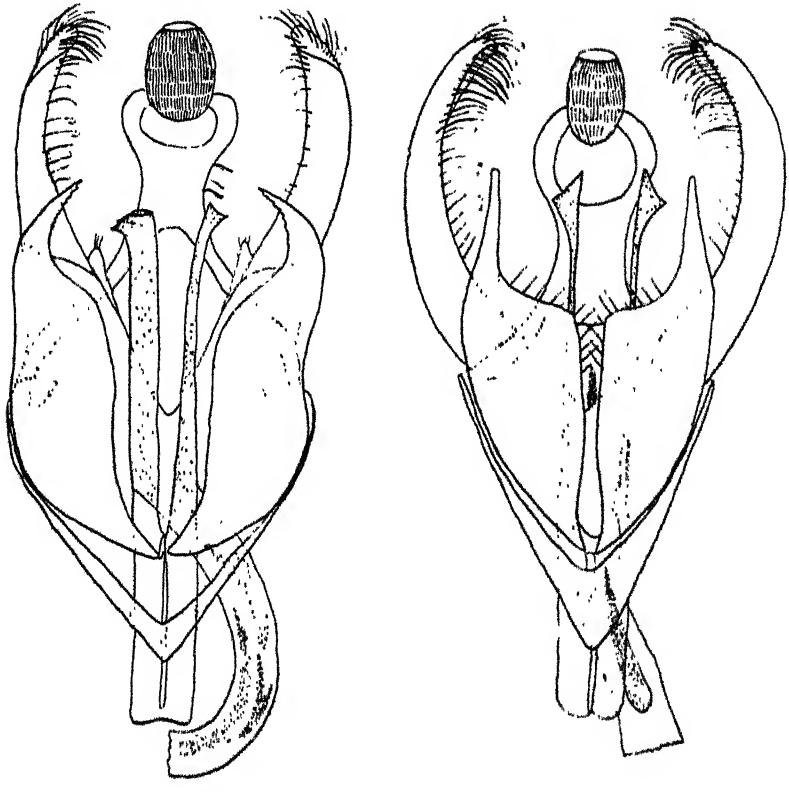


Fig. 1. *C. caespititiella*. Fig. 2. *C. glaucicolella*.
Ventral view of ♂ genitalia.

male among *Juncus communis* in Bagley Wood (Berks) on June 11th, 1927. One of my specimens was captured on May 30th, 1915, at South Hinksey (Berks). Many were still on the wing in Waterperry Wood (Oxon) on August 14th, 1927, and it would be easy to obtain later records.

[2] Some of the larvae found on *Juncus inflexus*, whether *caespititiella* or *glaucicolella* it is impossible to say—survived the summer without pupating. About the end of August I put the *Juncus* seed-heads into a tin and brought them indoors, in order to preserve the larval cases. A few days later I found some of the cases adhering to the top of the tin, evidently still containing living larvae. The same thing happened with larvae of *C. adjunctella* from Yarmouth. The habit, regular or occasional, of spending two winters in the larval stage is probably widespread among the *Coleophorae*.

These results agree in the main with those of Dr. Wood, who first separated *glaucicolella* from *caespititiella*, but the occurrence of *glaucicolella* so early as May and June has not hitherto been clearly pointed out. It follows that moths captured from May to mid-July may be either *caespititiella* or *glaucicolella*, from mid-July onwards almost certainly *glaucicolella*.

184 Woodstock Road, Oxford.
December 31st, 1927.

DESCRIPTION OF A NEW GENUS OF STAPHYLINIDAE (Col.) FROM INDIA.

BY MALCOLM CAMERON, M.B., R.N., F.E.S.

Masuria, n. gen.

Near *Pronomaea* Er. Very similar in facies, but with the head less produced in front, the mandibles less elongate, the labial palpi distinctly 3-jointed and the thorax rather strongly sinuate before the posterior angles. Head narrower than the thorax, transverse, the temples strongly margined below, not constricted behind, the neck thick. Labrum rounded in front, forming about ⅔ of a circle. Mandibles rather short, pointed, slightly curved, the right with a small tooth about the middle. Maxillary palpi elongate, the 1st joint very small, the 2nd rather long, slightly thickened towards the apex, 3rd a little shorter than the preceding and a little thicker apically, 4th very small, subulate. Inner lobe of the maxilla narrow, elongate, hooked at the apex and with 8 or 9 short, stout teeth, posteriorly with 4 or 5 setae. Outer lobe shorter than the inner, narrowed towards the apex which is ciliate. Mentum broadly, rather deeply, arcuately emarginate in front, the anterior angles prominent. Tongue small, narrow, oblong, about half as long as the 1st joint of the labial palpi, these elongate, distinctly 3-jointed, the 1st joint rather long and partially divided into two equal parts by a suture from the inner border, the basal part stouter than the apical; 2nd narrower and a little shorter than the 1st, 3rd narrower and much shorter than the preceding; paraglossae distinct. Prothoracic epipleura visible when viewed from the side. Mesosternum carinate, pointed, extending fully ⅔ of the length of the coxae, these moderately separated: metasternal process pointed, meeting the mesosternal process. Tibiae ciliate. Tarsi 4, 5, 5, the anterior pair with the first three joints short and subequal, the 4th longer than the three preceding together; middle pair with the first four joints short and subequal, the 5th about as long as the 2nd to 4th together; posterior pair with the 1st joint rather long, as long as the 2nd and 3rd together, 2nd to 4th subequal, the 5th about as long as the first. Claws very slightly curved. Elytra sinuate within the postero-external angles. The insects are found in stream moss and débris. Genotype *M. plumbea*.

Masuria plumbea, n. sp.

Elongate, convex, subparallel, leaden black, scarcely shining, the thorax, especially the margins, pitchy. The first three and the last joints of the antennae reddish-testaceous. Legs brownish-red. Length 4 mm.

Head distinctly narrower than the thorax, closely, rather finely punctured, finely grey-pubescent. Antennae gradually thickened towards the apex, the 2nd and 3rd joints of equal length, 4th to 6th longer than broad, gradually decreasing in length, 7th and 8th about as long as broad, 9th and 10th slightly transverse, 11th oval, about as long as the two preceding together. Thorax about a fourth broader than long, widest a little before the middle, from thence rounded and narrowed in front, strongly narrowed and sinuate behind to the obtuse but prominent posterior angles, slightly obliquely impressed internal to the sinuation; puncturation rather close, distinctly coarser and rougher than that of the head, between the punctures with a fine ground sculpture, pubescence distinct. Elytra a little longer and broader than the thorax, transverse, convex, with sculpture and pubescence very similar to that of the thorax. Abdomen at the base of the first three segments with some moderately coarse punctures, the rest of the surface finely and closely punctured and pubescent throughout.

N. India: Mussorie, Chakrata and Almora districts.

Masuria picipes, n. sp.

Leaden black, slightly shining. Antennae black, the first two joints obscurely testaceous. Legs pitchy, tarsi ferruginous. Length 3·5 mm.

Differs from the preceding in the smaller, narrower build, more shining appearance, differently coloured antennae and legs, the former rather shorter but similarly constructed, less strongly sinuate thorax with less prominent posterior angles, sculpture of the fore-parts less rough; the abdominal sculpture and pubescence scarcely differing from the preceding.

N. India: Chakrata district, Sainj Khud, alt. 6,500 ft.

Masuria ferruginea, n. sp.

Scarcely shining; head black, thorax and abdomen ferruginous, the latter more or less infuscate before the apex; elytra yellowish-red, slightly infuscate postero-externally. Antennae black, the first four and the last joints testaceous. Legs reddish-testaceous. Length 3·5–4 mm.

Differs from the preceding in the colour, longer antennae and broader head and thorax, the latter being as broad and as long as the elytra. The antennae have the 4th to 6th joints distinctly longer than broad, the 7th and 8th about as long as broad, the 9th and 10th a little transverse, the sculpture of the head and thorax is rather rougher than in the preceding species, that of the elytra scarcely differing. The abdomen is distinctly less thickly punctured and pubescent than in either of the preceding species.

N. India: Mussorie, Mossy Falls; Chakrata, Khedar Khud; Simla Hills, Gahan: alt. 7,000—8,000 ft.

15 Teesdale Road, Leytonstone, London, E.11.
February 8th, 1928.

Crabro carbonarius Dahlb.—an additional English locality.—With reference to Mr. Davis Ward's note in this Magazine (*ante*, p. 47) on the occurrence of this species, previously only recorded from Scotland, in Lancashire, I may say

that in June 1920 I captured several specimens at Durdar, near Carlisle, while flying around and settling on a felled Scots pine which had been down for a considerable time and was beginning to show signs of decay. In the sounder parts of the tree were numerous small circular holes, in and out of which I observed the Crabro passing, so it was doubtless breeding there. Unfortunately the ground was shortly afterwards cleared of felled timber, so that I was unable to follow up the observation.—F. D. Day, 26 Currock Road, Carlisle: *February 16th*, 1928.

ON *QUEDIUS HUMERALIS* STEPHENS.

BY B. S. WILLIAMS.

A short time ago Dr. Gridelli communicated to me a specimen of the species known to Continental Coleopterists as *Quedius humeralis* Steph., at the same time intimating he was not quite certain that it was the true *humeralis* of that author. Fortunately Stephens' type of this species is preserved in the National Collection, and examination of this specimen reveals the surprising fact that Stephens' *humeralis* does not belong to the *Raphirus*, but to the *Microsaurus* section of the genus.

It is probable that the confusion which has arisen as to the identity of this species is due mainly to the nature of Stephens' diagnosis, and particularly to his description of the size of the eyes. In the 'Illustrations of British Entomology, Mandibulata,' Vol. v, p. 221, he gives the following description :—

'Sp. 19 humeralis, ater, nitidissimus, palpis, elytris, pedibus, anoque rufescentibus (long. corp. 3 lin).

'St. humeralis Kirby MSS. Qu. humeralis.

'Steph. Cat., 278, No. 2935.

'Black, head orbicular, *very glossy*, glabrous, smooth with several punctures behind eyes, and one larger one on each side between them; eyes rather large; thorax glabrous, smooth with a double series of three punctures and 3 or 4 others on the lateral margin; *elytra dull reddish*, very much punctulated, slightly pubescent and obscure; abdomen with a purplish gloss in certain lights, with the edges of the segments and *the extreme tip reddish*; *legs* rufous: *antennae* subclavate, glabrous, *black* with the base *rufous*.

'Not common; I have once captured a specimen* within the metropolitan district.

'Taken near Barham in June, Kirby MSS.'

The following description is drawn up from notes made when examining the type :—

Head shining black, somewhat ovate; *thorax* dark pitchy red, bearing two dorsal rows each composed of three punctures, the anterior puncture touching the apical margin, the second about ⅓ the distance from apex to base, and the

* Presumably the type specimen in the Stephens' Coll.

posterior just beyond half-way; *scutellum* pitchy red; *hind body* pitchy brown, apex red; *antennae* and *maxillary palpi* red, 1st joint of antennae apparently as long as 2nd and 3rd together,* the two latter longer than broad, 4th about as long as broad 5–10 transverse (but not as strongly as in *cruentus*), 11th not so long as 9th and 10th together. *Elytra* red, slightly longer than thorax, closely and rugosely punctured, the interstices between the punctures being distinctly coriaceous. *Hind body* finely and fairly closely punctured, the puncturation becoming more sparse on the apical segments. *Legs* red, hind tarsi not quite as long as the tibiae.

Length 7 mm.

It is difficult to see the apex of the seventh ventral segment of hind body: it appears to be slightly emarginate, so presumably the specimen is a ♂.

It will be noticed there is a discrepancy in these two descriptions as to the antennal colouring. I have twice examined the specimen and am able to state definitely that the antennae are red; the apical joints may possibly suggest a slight infuscation, but this is so slight that for all practical purposes it can be ignored.

Regarding the size of the eyes, in the light of our modern classification these do not merit the term 'rather large,' but it has to be remembered Stephens treated the large-eyed *hoops* and its allies as a separate genus—i.e. *Raphirus* Leach. The eyes are similar to those of *Q. othinicnsis* Johan.; in fact *humeralis* is very like this species, differing chiefly in the more roughened and somewhat more closely sculptured elytra and the red apical segments of the hind body.

So far as I am able to ascertain, no other specimen of this species is known beyond the type. It is possible, however, that examples may exist in our collections mixed with *Q. cruentus* or its allies, from which the elytral characters will distinguish it.

My best thanks are due to Mr. K. G. Blair for his kind assistance, and to Dr. Cameron for examining the type-specimen with me.

In the near future I hope to deal with the two species at present standing in our collections as *Q. humeralis* Steph. and *Q. obliteratus* Er.

15 Kingcroft Road, Harpenden.
January 20th, 1928.

* Owing to the specimen being pinned, it is not possible to be definite about the relative lengths f he joints as the antennae are bent.

ON THE OCCURRENCE OF THE *ORTHACANTHACRIS HUMILICRUS* KARSCH (*ACRIDIDAE*) IN THE SUDAN.

BY H. B. JOHNSTON.

This species, the distribution of which is given in the little available literature on the subject as East and West Africa, has been hitherto considered a rare insect. The writer has it on the authority of Mr. Uvarov that few examples are to be found in European collections. Its more abundant occurrence during the last three months of 1927 in the Gezira District of the Sudan would appear to warrant a few remarks on this interesting locust.

DESCRIPTION OF ADULTS.—From the examination of some fifty specimens the average measurements of the adult appear to be as follows :—

	♂ mm.	♀ mm.
Total length	67	85
Pronotum	9	13
Tegmina	55	71
Hind femur	25	31

The female is thus a much larger insect that the male, also Sudan specimens of the latter show a much shorter elytral length than do the Eritraean examples referred to by Uvarov (Ann. Mag. Nat. Hist., Ser. 9, Vol. xi, 1923, p. 489).

A short description made from a living example may be given :

The fresh individual is a strikingly beautiful object of a prevailing grey colour, and when alive possesses a velvety gloss. The pronotum shows a distinct, strongly convex carina cut by three deep sulci. Carina black on the sides, with crest frequently whitish. Lateral lobes of the metazona somewhat darker than the prozona. The latter marked by small well-marked black areas. Punctulation of metazona more dense than that of prozona. Former with a number of very clearly marked raised white pustules. Prosternal spine laterally compressed and rounded at the apex. Lateral segments of thorax with black spots on their lower half. Hind femora long and slender, not broadened considerably in their basal portions. Hind tibiae densely pubescent on the upper surface between the two rows of lateral spines. Tegmina long, narrow and tapering to the apex. Hind wings densely infumate in a broad band extending from the base almost to the hind margin, and for more than two-thirds across the wing. The examination of a long series shows this area to be fairly constantly defined. Abdomen with an ill-defined band on each dorsal segment.

The prevailing colour of the majority of specimens is light grey profusely marked with black. A very distinct variation exists, however, in certain individuals of both sexes. These show two light yellow patches, one on the prozona, and another in the region of the episternum. The latter usually extends downwards and across the ventral portion of the thorax. The coxae also present a similar colour, which continues into the basal part of the hind femora.

BIONOMICS.—This species had not been noticed in the Sudan before 1926, when three specimens were taken during October and November. In the present year they have been taken in greater

numbers than previously. The first specimen, a ♀, was taken on 1.xi.27, and later in the same month larger numbers were met with. One female was found containing eggs in an advanced stage of maturation on 7.xi.27, but general breeding has not been observed. The immature stages appear to be quite unknown at present. In its habits the insect is wary and difficult to approach. It lurks among trees and bushes, and is hardly ever seen in flight unless if disturbed, when it flies with a quick action of wings, and dives rapidly to cover in an almost vertical descent. It has been found most frequently among trees, particularly *Pithecolobium dulce*, the leaves of which it devours readily. In captivity it shows a liking for cotton leaves, and it has been frequently met with singly among irrigated cotton throughout the Gezira District between the Blue and White Niles.

It is possible that further investigation will show a resemblance in habits between this species and *Anacridium moestum melanorhodon* Walk., a common insect in the Sudan, which possesses moderate powers of migration. Whether its greater local abundance is due to accelerated breeding as a sedentary species, or to its migration, is uncertain, though observations made during the dissection of specimens would appear to favour the latter view.

Uvarov (*op. cit.* pp. 141, 489) has pointed out the structural differences between the two genera *Anacridium* and *Orthacanthacris*, which are closely allied.

A comparison made from living examples of the two species *A. moestum melanorhodon* and *O. humilicrus* gives the following easily observed points of difference :—

Orthacanthacris humilicrus.	*Anacridium moestum melanorhodon.*
General colour grey.	General colour tinged with red.
Tegmina long and narrow.	Tegmina shorter and broader, particularly at apex.
Hind femur long and narrow.	Basal portion of hind femur thicker and much broader.
Hind tibia heavily pubescent.	Not pubescent.
Hind tibia grey.	Hind tibia reddish blue.
Infumate area on hind wing large and dense.	Infumate area not large and often merely slightly infuscated.

O. humilicrus has been observed within the Sudan only in the Gezira district (approximately, Lat. N. 14° 25′, Long. E. 33° 30′) and the extent of its distribution in others parts of the country is still unknown.

The assistance of Mr. B. P. Uvarov in determining specimens and reading this note before publication is gratefully acknowledged.

Khartoum.
December 1927.

A PECULIAR FEEDING-HABIT OF *CULEX PIPIENS* L.

BY J. G. MYERS, F.E.S.,
Imperial Bureau of Entomology.

In North Essex in the autumns of 1926 and 1927 I noticed a peculiar feeding-habit of the common mosquito, *Culex pipiens* L. (kindly determined by Mr. F. W. Edwards), under conditions which may well have prevailed for a number of centuries. The scene was an ancient farmhouse, at least 450 years old, where the milk is still exposed in huge earthenware pans in order that the cream may rise and be skimmed. The dairy is a white-washed, low-ceilinged room forming part of the main dwelling-house and furnished with a latticed opening facing about south. This opening is sometimes shuttered at night, but not sufficiently to prevent the entrance of mosquitoes.

On September 28th, 1926, I caught resting on the white walls and ceiling of this dairy no fewer than 226 female mosquitoes—all *C. pipiens*—practically all of which, as shown by dissection of a large number, had been feeding on skim milk. The pans, with milk of different ages, are not always in the same position on the shelves. Milk ready for skimming might be found in one corner one week, in another the next, and the greatest aggregation of mosquitoes was invariably in the vicinity of the long-standing milk.

The method of feeding was often observed, even during the day. The insect stood on the layer of cream and pierced it apparently always to the skim-milk beneath. In no case, among all these hundreds, was one seen feeding at the freshly exposed milk—nor on the jar of accumulated cream which awaited the weekly churning. No traces of cream were noticeable in dissected examples.

The number of nightly visitors may be gauged by the fact that 30 mosquitoes were observed in the dairy the morning after all had been collected, and as an additional number were flying and difficult to count, there were at least 50 present. In the course of two or three days the total was again several hundreds.

Mosquitoes were rarely seen in other parts of the house, and I think no one was ever bitten—not even visitors.

Anopheles maculipennis Mg. (determined by Mr. F. W. Edwards) was once captured in the house, but was not found drinking milk.

Cream separators are an innovation as yet only begun by a neighbouring farm, but are unpopular among the village consumers because the skim-milk, which alone they use, contains

smaller traces of cream when 'separated' than when hand-skimmed. It is interesting to reflect that the inevitable introduction of these machines may yet be the cause of one of those 'plagues' of mosquitoes of which one hears more in England every year; but an examination of the literature shows that *Culex pipiens* is believed to maintain itself in England very largely on avian blood, and very rarely bites man in this country.

How this habit of milk-drinking could arise is not so obvious as one might at first suppose. An explanation in terms of the tropistic, or any other similarly naïve theory of insect behaviour, would find a stumbling-block in the fact that the warm milk, freshly brought in from the cow-shed and appreciably odorous, is entirely neglected in favour of that which has accumulated a relatively stable 'skin' of cream—in spite of the fact that the former would be readily negotiable from the edge of the pan, even if the general surface were too fluid for comfortable standing. Skim-milk, when the cream-layer has been removed, was also unattractive. The skin formed by the cream is thus apparently an essential condition for feeding. The conditions are strikingly analogous to those offered by the vertebrate host itself—a skin and a liquid beneath—and it is noteworthy that they are likewise exploited apparently solely by the female insects.

Farnham House Laboratory, Farnham Royal, Bucks.
February 2nd, 1927.

THE 'BALFOUR-BROWNE' WATER-NET.

BY PROF. F. BALFOUR-BROWNE, F.R.S.E., F.Z.S., F.E.S.

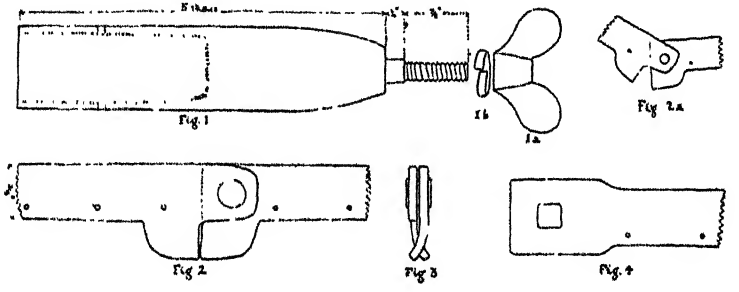
In Part IV of 'The Natural History of Wicken Fen,' just published,* there is a paper on 'The Coleoptera of Wicken Fen,' in which is given a description and three sketches of what is described as the 'Balfour-Browne net.' Scarcely anything stated is correct, the drawings suggesting one of my earliest experiments, and, as other authors may let their imaginations run wild upon the subject, perhaps it would be well that there should be in print a correct description of the net.

The apparatus can be obtained, more or less correctly made to a pattern which I lent for the purpose, from Messrs. Watkins and Doncaster, 36 Strand, London, W.C.2, but anyone is at liberty to make it or have it made.

The handle is of ash, about 6 feet long and at least 1½ inches in diameter. For convenience, this pole is divided into two, one part

* Bowers & Bowers, Cambridge.

being fitted with a brass (not copper) tube as a socket, the other being shod in a brass sheath, which makes it easy to insert or withdraw this part from the socket. At the opposite end of the shod piece is fitted a ferrule of a form shown in fig. 1. The ash is let into the ferrule for at least two inches and is fixed there by a nail run through both, the ferrule itself being $6\frac{1}{8}$ inches long from end to end. The fixing of this joint is most important and it must be made so that no water gets in, as there is a great strain at this place and water will soon rot the wood and cause it to break. I keep out the water by occasional treatment of the surface with gold-size, and, although I have had my present handle for more than eighteen years, it is as good as it was when it was new.



About five inches from its base the ferrule tapers until it is only $\frac{9}{10}$ of an inch in diameter and there it is a square-shaped boss with sides about $\frac{9}{10}$ of an inch wide and just less than $\frac{1}{4}$ of an inch high. Above this the remaining $\frac{7}{8}$ of an inch are rounded off to $\frac{1}{4}$ inch diameter and threaded, and, on this thread, there fits a thumb-screw.

The ring, which carries the net or bag, is made of a strip of iron $\frac{3}{4}$ inch wide and $\frac{1}{8}$ inch thick, but for convenience it is divided into two halves, each half being curved and cut to a length so that the two together form a circle 11 inches in diameter with a small overlap. After many experiments I found that this size was the best for all purposes and, although I have a ring of 8 inches diameter, I very seldom use it.

The two halves of the ring are riveted together at one end in such a way that the rivet forms a hinge (figs. 2 and 2*a*). The other end of each half is flattened out to a width of an inch, and in this flattened area is cut a square hole which just fits over the square boss on the ferrule (fig. 4).

The ring can thus be folded and packed away or opened and fixed to the handle, but it was found that the hinge was a weak

spot when the net was being forced through weedy water. This weakness was overcome by welding a small projection to each half in such a way that, when the ring was opened, the projections came into contact and supported the joint (figs. 2 and 3).

Three-eighths of an inch from the edge to which the above-mentioned projections are attached the ring is bored all round with holes $\frac{1}{8}$ to $\frac{3}{16}$ of an inch diameter and one inch apart. As a refinement, a fine groove may be cut on the outside of the ring between each pair of holes. The completed ring is galvanised to prevent rusting.

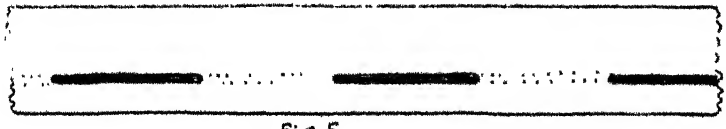


Fig. 5

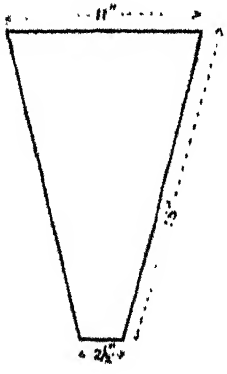


Fig. 6.

Fig 7

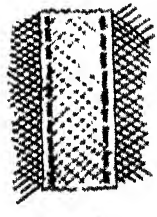


Fig 8

Fig. 9

The net or bag is attached to the ring by means of *soft* copper wire of about 18 s.w.g. This is done in the way shown in fig. 5. The net itself is made of four pieces cut to the shape and size indicated in fig. 6 and sewn together first along the sides. The method of folding in and sewing is shown in fig. 7, the sewing, which is usually done by machine, being run down and up the seam (fig. 8). The side seams having been sewn up, the bottom of the net, which does not actually come to a point, is turned over twice

and sewn down, much as were the sides, so that nowhere is there any projecting edge.

The material is strong bolting silk with about 25 meshes to the linear inch (heaven help anyone trying to use a water-net with 60 meshes to the inch, as recommended in the paper already referred to). For those who require a cheaper material, there is a linen canvas of the same mesh which lasts longer than the bolting silk, but is not quite so good, as the threads swell somewhat in water and thus diminish the size of the meshes. A larger meshed material can be obtained, but it lasts a very short time before the threads begin to give way. I have tried mosquito-netting, which is excellent as long as it lasts, but its life is very short.

The top of the net is sewn on to a strip of jean or strong canvas four inches wide. This material is then doubled over and sewn down upon the other side of the edge of the bolting silk, so that a strong and neat join is effected (fig. 9). The jean border is now wired to the inside of the ring, care being taken to begin the wiring for each half at the hinge and thus, if the net is rather large for the ring, as it should be, the slack will come at the back, where it will not matter.

The ring is held on the ferrule by means of the thumb-screw, as already mentioned (fig. 1*a*), but there should be a washer, preferably a spring one (fig. 1*b*), to make sure that the screw does not work loose under the strain.

I have a jean case, like that supplied with fishing rods, for the net handle, and the folded net takes up very little space and goes into a mackintosh bag inside my satchel.

EXPLANATION OF FIGURES.

Fig. 1. The ferrule with thumbscrew and spring washer. The hollow space into which the end of the ash handle is fixed is indicated by dotted lines.

Fig. 2 & 2A. *Part of the ring to show the hinge and 'stops.'*

Fig. 3. Shows the way the stops are bent so as to come into contact.

Fig. 4. Part of the ring to show the fitting of the ferrule.

Fig. 5. Part of the ring to show the method of binding on the net. The black lines indicate the copper wire threaded in and out, 'sewing' the jean top of the net to the ring.

Fig. 6. The shape and measurements of one of the four pieces of bolting-silk or linen canvas of which the net is made.

Fig. 7. Indicates the method of folding the seam when sewing together the four pieces of bolting-silk or linen canvas.

Fig. 8. Indicates the way to sew the seam, the stitches being shown by the two parallel broken black lines.

Fig. 9. Indicates how to attach the jean top, which is double, to the bolting-silk or linen canvas.

Winscombe, Somerset.
January 30th, 1928.

Useful Habit of the Mole.—On the 11th of November last, near Ayot, Herts., I dug a few mole's nests: these produced *Oxypoda longipes* Rey (4), *Quedius othinensis* Johan. (3), a number of *Medon propinquus* Bris., and *Heterothops nigra* Kr. As my time was limited I had to leave one or two nests untouched. A fortnight later I again visited the ground, intending to examine the nests left on the previous occasion. On my way to these I had to pass the scene of my earlier operations and noticed all the dug nests had been re-made. Out of curiosity I opened a hillock and found a freshly made nest of bright green grass: this was shaken out and found to contain beetles. I set to work and re-dug them all, with this result: *Oxypoda longipes* (15), *Quedius othinensis* (2), and many *Medon propinquus*, the common *Heterothops nigra* being represented by only two examples.

In localities where nests are scarce, this habit of the mole of re-making disturbed nests is well worth remembering. Unfortunately bad weather and swamping prevented further investigation of these nests.—B. S. Williams, 15 Kingcroft Road, Harpenden: *January 20th*, 1928.

The smallest moth on record.—Among a series of *Nepticula serella* Stt. which I have lately been breeding from larvae found on *Potentilla Tormentilla* at Cothill (Berks) is a specimen which, though fully developed, has an alar expanse of only two millimetres. Is not this a record for minuteness? Dwarf examples occasionally turn up in many species of *Nepticula*, and I possess specimens of *aceteosae*, *arcuatella*, *betulicola*, *centifoliella*, *dulcella*, *malella* and *quinquella* having an expanse of only three millimetres; but this one easily excels them all in reduction of size. Unfortunately the setting of this atom quite baffled me; the smallest silver wire pin was too large for it, and after vain efforts I had to be content with extending its forewings, minus most of their scales. It should be added that *N. serella* Stt. is probably conspecific with *N. ulmariae* Wck. and *N. filipendulae* Wck.—E. G. R. Waters, 184 Woodstock Road, Oxford: *February 16th*, 1928.

Hemiptera from North Wales (Merioneth).—Our knowledge of the Hemiptera of North Wales is not so extensive as it might be, Carnarvon being the only county where intensive collecting appears to have been carried out. For the county of Merioneth for example, E. A. Butler in his 'Biology of the British Hemiptera-Heteroptera' (p. 625 *et seq.*), lists only 24 species.

As a contribution towards a knowledge of the distribution of the Hemiptera in North Wales, the following list is given, representing almost 140 species (including naturally some common ones), collected during late August and early September, 1927 (towards the close of a poor season), in the districts around Barmouth, Arthog and Dolgelley. A number of curious omissions of what are usually common species will be noticed. This list should be compared with that given by H. P. Collett for Anglesey (E.M.M., 1924, p. 37), and by myself for the Llandudno district (E.M.M., 1925, p. 62).

Heteroptera: *Palomena prasina* L., immature individuals of various ages in plenty, but no adults, Barmouth. *Piezodorus lituratus* F., on both gorse and broom, Barmouth. *Pentatoma* (*Tropicoris*) *rufipes* L., very plentiful. Eggs with newly emerged young occurred on a horse-chestnut leaf, and very young larvae on oak. Adults were common. *Myrmus miriformis* Fall., fairly plentiful in grass, Arthog. *Cymus glandicolor* Hhn., Arthog. *Macrodema micropterum* Curt., at heather roots, Barmouth. *Stygnocoris pedestris* Fall., Arthog and Barmouth. *Trapezonotus arenarius* L., Arthog. *Scolopostethus decoratus* Hhn., common, Dolgelley and Barmouth. *Berytus minor* H.-S., fairly plentiful in

grass, Arthog. *Metacanthus punctipes* Germ., on *Ononis*, Fairbourne. *Derephysia foliacea* Fall., plentiful in ivy, Barmouth. *Tingis cardui* L., Barmouth. *Nabis major* Costa, Arthog; *N. limbatus* Dhlb., Arthog and Barmouth; *N. flavomarginatus* Sch., Dolgelley and Barmouth; *N. rugosus* L., Arthog and Barmouth. *Temnostethus pusillus* H.-S., micropterous forms on oak, Dolgelley and Arthog. *Anthocoris confusus* Reut., *A. nemoralis* F., and *A. nemorum* L. common. *Tetraphleps bicuspis* H.-S. (*vittata* Fieb.), Dolgelley. *Acompocoris pygmaeus* Fall., Dolgelley. *Pithanus maerkeli* H.-S., common in grass. *Phytocoris longipennis* Flor., *P. dimidiatus* Kb., and *P. ulmi* L., Barmouth and Dolgelley. *Adelphocoris lineolatus* Goeze, on heath and heather, Barmouth, Arthog and Dolgelley. Butler (*op. cit.* p. 393) states that the occurrence of this species on heather is exceptional, but that it has been found on this plant in the neighbourhood of Snowdon. *Calocoris norvegicus* Gmel. (*bipunctatus* Fab.), Barmouth. *Stenotus binotatus* F., not common, Dolgelley. *Lygus pabulinus* L., common; *L. contaminatus* Fall., plentiful on birch; *L. pratensis* L., common; *L. cervinus* H.-S., Barmouth; *L. rubricatus* Fall., on Scots fir, Dolgelley. *Liocoris tripustulatus* F., plentiful on nettles. *Stenodema calcaratum* Fall., *S. laevigatum* one, and *S. holsatum* F., common. *Trigonotylus ruficornis* Geoff., Dolgelley. *Monalocoris filicis* L., and *Bryocoris pteridis* Fall., common. *Dicyphus globulifer* Fall., on Red Campion, Barmouth. *Campyloneura virgula* H.-S., on oak, Barmouth. *Blepharidopterus angulatus* Fall., plentiful. *Orthotylus marginatus* Reut., Dolgelley; *O. virescens* D.& S. (*chloropterus* Kbm.), on broom, Barmouth; *O. ochrotrichus* Fieb., and *O. viridinervis* Kb., on elm, Barmouth and Dolgelley; *O. ericetorum* Fall., plentiful under heather, Barmouth and Dolgelley. *Heterotoma merioptera* Scop., not common, Barmouth. *Malacocoris chlorizans* Panz., on hazel, Barmouth and Dolgelley. *Phylus coryli* var. *avellanae* Mey., Arthog. *Psallus betuleti* Fall., Barmouth; *P. alnicola* D.& S. common; *P. roseus* F., Barmouth; *P. salicellus* Mey., Arthog. *Atractotomus magnicornis* Fall., Dolgelley. *Plagiognathus chrysanthemi* Wolff, Barmouth; *P. arbustorum* F., plentiful. *Asciodema obsoletum* Fieb., Barmouth. *Gerris lacustris* L., Barmouth. *Velia currens* F., Barmouth. *Salda lateralis* Fall., and *S. pallipes* F., plentiful on the mud-flats, Barmouth; *S. saltatoria* L., Dolgelley. *Arctocorisa lugubris* Fieb., *A. venusta* D.& S., and *A. fabricii* Fieb. (*nigrolineata* Fieb.), Barmouth.

Homoptera: *Aphrophora alni* Fall., Barmouth. *Philaenus spumarius* L. (f. *fasciatus* Fab. and f. *lineatus* Fab.), plentiful; *P. lineatus* L., Dolgelley. *Ulopa reticulata* Fab., under heather, Barmouth. *Megophthalmus scanicus* Fall., Fairbourne, Arthog and Barmouth. *Tettigonia viridis* L., plentiful in the marshes, Barmouth. *Enacanthus interruptus* L., Dolgelley. *Batracomorphus lanio* L., common on oaks, Barmouth and Dolgelley. *Macropsis rubi* Boh., on brambles, Arthog. *Idiocerus populi* L., and *I. confusus* Flor, Arthog. *Agallia venosa* Fall., Arthog. *Acocephalus nervosus* Schr., plentiful; *A. bifasciatus* L., fairly numerous under heather, Barmouth; *A. albifrons* L., common, Arthog and Barmouth. *Eupelix cuspidata* Fab., immature and adult specimens in grass, Arthog. *Athysanus obscurellus* Kbm. (*lineolatus* Br.), Arthog and Barmouth; *A. obsoletus* Kbm., plentiful; *A. melanopsis* Hdy., Arthog. *Deltocephalus distinguendus* Flor, common; *D. punctum* Flor, in grass, Arthog; *D. abdominalis* Fab., Arthog; *D. argus* Marsh., Barmouth; *D. thenii* Edw., Barmouth and Arthog; *D. pulicaris* Fall., plentiful in grass. *Jassus mixtus* Fab., on oaks, Barmouth and Arthog. *Thamnotettix subfusculus* Fall., common; *T. splendidulus* Fab., Barmouth. *Limotettix striola* Fall., Arthog; *L. persimilis* Edw., Arthog; *L. sulphurella* Zett., plentiful. *Cicadula 7-notata* Fall., Dolgelley; *C. 6-notata* Fall., common. *Alebra albostriella* Fall., Barmouth and Arthog. *Chlorita*

viridula Fall., Barmouth, and Dol., Pen, *T. flaveolus* Reut., Dolgelley. *Eupteryx notatus* Curt., Arthog; *E. urticae* Fab., Barmouth; *E. stachydearum* Hdy., Barmouth; *E. auratus* L., Barmouth; *E. atropunctatus* Goeze, Barmouth; *E. signatipennis* Boh., on meadow-sweet, Dolgelley; *E. germari* Zett., on Scots fir, Dolgelley; *E. pulchellus* Fall. and *E. concinna* Germ., on oak, Dolgelley. *Typhlocyba 6-punctata* Fall., on sallows, Arthog; *T. ulmi* L., common; *T. douglasi* Edw., Barmouth; *T. cratægi* Dougl., Barmouth; *T. avellanae* Edw., Dolgelley; *T. quercus* Fab., Arthog. *Zygina alneti* Dahl., Arthog; *Z. neglecta* Edw., Arthog. *Oxiis cuneularius* L., Dolgelley; *O. nervosus* L., common; *O. brachyrannus* Scott, Arthog. *Issus coleoptratus* Geoff., in ivy, Barmouth. *Conomelus limbatus* Fall., plentiful in rushes, Barmouth. *Delphax pellucida* Fab., Arthog; *D. aubei* Perris, on the sand-hills, Barmouth. *Livia juncorum* Latr., Arthog. *Rhinocola ericae* Curt., Arthog. *Psyllopsis fraxini* L., Barmouth. *Psylla peregrina* Forst., Barmouth; *P. alni* L., plentiful; *P. nigrita* Zett., common on pines. *Trytaena genistae* Latr., Barmouth. *Trioza urticae* L., common.—James M. Brown, 176 Carter Knowle Road, Sheffield: *January 28th*, 1928.

Gastrodes abietis L. *in Glamorgan.*—As Mr. Butler in his 'Biology of the British Hemiptera' only gives ten English counties and no Welsh, it may be well to record the occurrence of this species here. On Dec. 6th last, from a gathering of fallen spruce cones at Sully, two examples were taken; subsequently, on Jan. 8th, from another gathering nine more specimens occurred, but the common *G. ferrugineus* was far more plentiful, hardly a cone but yielded one or more, sometimes seven or eight from one cone.

The following species are also additions to Mr. Butler's census for this county, and have occurred since my last note (E.M.M., Vol. LXII, p. 21).

Chorosoma schillingi Schill., fairly plentiful on sandhills at Porthcawl, 5.viii.26; *Corizus rufus* Schill. and *Neides tipularius* L., at Oxwich Bay, 8.viii.26, by Dr. W. J. Fordham; *Calocoris ochromelas* Gmel., Cwrt-yr-ala, on oaks, 5.vi.27; *Corixa panzeri* Fieb., Penarth, 2.vi.26, and plentifully in Kenfig Pool, ix.26; *C. germari* Fieb., Porthcawl, viii.25; this last was identified by Mr. Butler and was omitted in previous note.—H. M. Hallett, 64 Westbourne Road, Penarth: *February 3rd*, 1928.

Notes on Mellinus arvensis Linn.—On Oct. 4th, 1927, I found *Mellinus arvensis* frequenting a sandpit at Warmwell Heath, Dorset, in quite large numbers, the burrows being particularly numerous on a recently cut vertical wall of the pit. Several wasps were observed arriving with prey, which consisted of completely paralysed Diptera. These, while in transit, were gripped firmly round the neck by the wasp's mandibles. Thus the wasp could alight on the sand and complete its journey on foot without letting go its hold; but, as far as could be seen, the wasps while in flight used one or more legs to support the rather ponderous burden. The wasp in many cases left its fly on the ground and went apparently to find the exact position of the burrow, and, after returning to pick up the fly, completed the rest of the journey on foot. This it did even if a vertical surface had to be scaled, and numerous attempts were required to hoist the prey successfully.

The burrows, which were on the average 14 inches long, ran straight into the [illegible] and with a downward inclination, and only in one or two cases were they curved. Of those that were completely excavated all were freshly made and none of the cells contained more than three flies. The cells are merely the enlarged ends of the burrows, and it seemed that in one case at least the

burrow branched and led to more than one cell. In another case three wasps came out of a burrow while it was being excavated, though only one stocked cell was found.

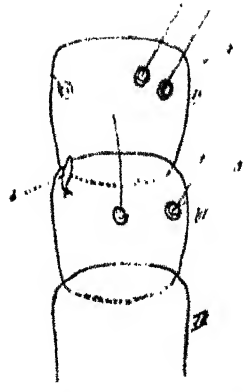
On this and the following day the following Dipterous prey were taken :— (A) From cell No. 1 : *Euphoria cornicina* F. ♀, *Hyetodesia lucorum* Fallen ♂, *Hydrophoria conica* W. ♂ ; from cell No. 2 : *Pollenia rudis* F. ♂♀, *Hydrophoria conica* F. ♂ ; from cell No. 3 : *Pollenia rudis* F. ♂♂ ; from cell No. 4 : *Musca autumnalis* Deg. (*corvina* F.), *Pollenia rudis* F. ♂ ; from cell No. 5 : *Euphoria cornicina* F. ♀, *Pollenia rudis* F. ♀.

(B) Carried by wasps, or left by them outside burrows : *Pollenia rudis*, 6 ♂, 2 ♀ ; *Euphoria cornicina*, 1 ♂, 4 ♀ ; *Voria* (?) *ruralis* Fallen, 1 ♀ ; *Pyrellia* (?) *cadaverina* L., 1 ♀ ; *Hyetodesia* (?) *marmorata* Zett., 1 ♀ ; *Scatophaga stercoraria* L., 1 ♀. In addition I have three *Pollenia rudis* ♀♀, taken earlier in the year, each being carried by a *Mellinus arvensis* ♀.

As far as could be judged, the wasps did not seem to be selecting any particular species of fly or to show preference to either sex. The prey in no case showed any signs of life. The majority of the specimens however were undamaged, though a few had clearly been mutilated by the wasp. Believing all to be dead, I did not make any accurate observations at the time, nor did I keep apart flies left outside holes and perhaps intentionally discarded, but on Oct. 9th I noticed that many of the flies were still perfectly fresh, soft and supple, in direct contrast to those specimens that were dead and already dried up. I made no actual count, but I came across no dead specimen that had not been visibly mutilated or accidentally damaged. Two days later (Oct 11th) a count was made and eleven specimens were still in a fresh condition. On Oct. 14th only two specimens were left in this condition, but these did not show any signs of stiffening until Oct. 19th. The following day (Oct. 20th) they were quite stiff. Of the thirty specimens of prey, therefore, two remained fresh for a fortnight. It would appear therefore that though *Mellinus arvensis* normally kills its prey, in some cases the treatment of the latter may not be drastic enough to produce any further immediate effect than paralysation.

I am indebted to Dr. C. D. Day, of Dorchester, for his naming the Diptera, and to Dr. C. G. Lamb for confirming the identifications. Three specific names in the above list are queried, because it is almost impossible to be quite sure of the determination of single female specimens.—G. M. Spooner, Christ's College, Cambridge : *January 8th, 1928.*

Notes on the Antennal Sensory Organs of Campodea.—In his 'Apterygota of the Seychelles' (1916) Carpenter states that Silvestri has overlooked the 'auditory' sensilla on the 3rd to 6th antennal segments, in the genus *Ledidocampa*. Carpenter states that there are four of these on each segment, two on the upper and two on the lower side, and that in structure they are similar to those in the species of *Campodea*. Silvestri, in his drawings (Contribuzione dei Campodeidoe d'Europa, 1912) shows only two of these in all species of *Campodea* and *Plusiocampa*, both on the upper side of the same segments as above. He does not state that there are only two, but simply refers in his descriptions to the drawings. One must conclude therefore that he has only observed two on each segment. In examining specimens of *C. fragilis* Mein. I find that the 3rd segment has two of these 'auditory' bristles, the 4th and 5th three, two on the upper side and one below, while segment 6 has only two on the upper side. I find the same numbers also on *C. lubbocki* Silv. and *C. meinerti* Bagnall. This numerical arrangement is probably typical of the genus *Campodea*. On the upper outer corner of the 3rd segment there is also another sensory organ that



Segments II to IV of left antenna of *Campodea fragilis* Meinert.
(*a*) 'Auditory' bristle. (*b*) Clavate sensory organ.

does not appear to have been previously observed. It takes the form of a somewhat elongate scale with a distinct elbow at the base. This organ is also present in all the three species of *Campodea* referred to above.—H. Womersley, Sunny Meads, West Town, Somerset: *December 25th*, 1927.

Note on a Nematode parasite of Campodea.—As I have not been able to find any notice of internal parasites in species of *Campodea* it is perhaps worth while putting on record a case of the occurrence of such a parasite. Amongst a number of specimens of *Campodea fragilis* Meinert, taken at West Town, Somerset, 14.xii.27, was one which contained in the prothorax an encysted specimen of a Nematode. Through my friend, Mr. H. H. Slater, this was submitted to Dr. H. A. Baylis of the British Museum, who says: 'It appears to be a larval Spirurid, but it is impossible to get further than that. Nematodes of this group, which are parasitic as adults in invertebrates, pass their larval stages, or part of them, encapsuled in invertebrates.' To these two gentlemen I wish to extend my best thanks.—H. Womersley: *February 3rd*, 1928.

Review.

'New Zealand Empididae.' By J. E. Collin. Pp. 110, 27 figures. British Museum (Natural History). January 1928.

This small volume contains a revision of the New Zealand flies of the family Empididae, and is based entirely on collections in the Natural History Museum. The greater part of this material has been received during the last few years from Mr. T. R. Harris, of Ohakune Junction, at the foot of Mt. Ruapehu, North Island. The country around Ohakune is primitive bush land, and supports a very varied insect fauna. Mr. Harris, an engine-driver by profession, is to be congratulated on the excellent use he has made of his opportunities for investigating this fauna; he has been very generous in presenting a large amount of material to the British Museum, including a very extensive series of Diptera

of all families. Mr. Collin, in the present report, states that previous to the examination of these collections twenty-three species of Empididae were known from New Zealand. The total now stands at 102, 79 being described as new in this volume. Adequate keys are given for the determination of all the species, and the more interesting forms (including examples of seven new genera) are illustrated.

Obituary.

John Hartley Durrant, F.E.S.—It is with sincere regret that we record the death of this well-known and highly esteemed Lepidopterist, on January 18th, at his residence at Putney. He was born at Hitchin, Herts, on January 10th, 1863, and from an early age he was attracted to the study of Lepidoptera, the so-called 'Micros,' to the knowledge of which he made such important contributions during his lifetime, being his favourites from the first. In 1886 the late Lord Walsingham appointed him his curator and assistant, the great collection of Micro-Lepidoptera at Merton Hall, Norfolk, ultimately numbering upwards of a quarter of a million specimens, as well as the extensive Entomological Library, being placed under his care; and when, in 1910, these were transferred *en bloc* to the National History Museum, he continued in charge of them as a member of the scientific staff of the Insect Room. An accurate and conscientious worker, with an unrivalled knowledge of the literature relating to the smaller moths, Durrant was closely associated with Lord Walsingham in the preparation of many important memoirs, including the volumes of the 'Biologia Centrali-Americana' and the 'Fauna Hawaiiensis' devoted to the Micro-Lepidoptera, as well as the valuable series of papers on the same group of insects occurring in Southern Europe and Algeria, which appeared at intervals in the pages of this Magazine.

As one of the chief authorities on Entomological Nomenclature, Durrant shared with Lord Walsingham the onerous task of compiling the now well-known 'Merton Rules,' and on the inception, in 1913, of the British National Committee on this important subject, he was appropriately appointed its first Secretary and held this post for eleven successive years. He shared with Mr. E. Meyrick, F.R.S., happily still with us, the recognition as one of the two leading British exponents of the Micro-Lepidoptera, while the value of his work on the ravages of *Ephestia* and its allies, in association with Major-General Sir W. W. O. Beveridge, K.B.E., D.S.O. (Army Biscuit Enquiry, 1913), was such as to warrant its republication during the Great War by the Trustees of the British Museum.

Elected a Fellow of the Entomological Society in 1883, in his twenty-first year, he was until quite recently one of the most regular attendants at its meetings. He served on the Council in 1911—13, and again 1919—21, and in 1912 and 1913 was one of the Vice-Presidents of the Society. From 1917 onwards he was an esteemed member of the editorial staff of the 'Entomological Record.'

His originally robust health was sadly undermined by strenuous work with the British Red Cross Society during the War, and by the loss of an only daughter during the same period, and his many friends saw with much regret his evident decline in recent years. One of the most familiar figures in the 'Insect Room' at South Kensington, his genial address and ever-ready courtesy and assistance will long be missed by all who had the pleasure of meeting him there.

BRITISH GALL MIDGES. II.
LESTODIPLOSIS Kieffer.

BY H. F. BARNES, B.A. (OXFORD).
(*Research Scholar, Ministry of Agriculture.*)

The genus *Lestodiplosis* Kieff. consists of a large number of medium-sized midges, which are very difficult to separate. The male genitalia are too similar to be of use in identifying the species. However, these can be distinguished by the proportions of the length and breadth of the flagellar stems and palps of the males, and by the proportions of length and breadth of the flagellar necks and palps in the case of the females. The proportions are found to vary slightly in different specimens, but if due allowances are made for this variation, a workable key can be made. The species in the keys have all been reared, and the types and paratypes are in the writer's collection. In any case, where more than one specimen is on the type slide, the actual type is indicated on the slide itself.

In the keys, eight species occur in both male and female keys, while five species occur only in the key for males, and eleven species occur only in the key for females. Descriptions of two other species, which cannot at present be placed in the keys, are given in full. Two species, *L. pini* sp. n. and *L. macrorosae* sp. n., are described in detail, as there is a possibility that their larvae are predaceous on aphides.

The larvae of all the species in the genus *Lestodiplosis* are red with a long neck; the second antennal segment is very long and pointed; there is no anchor process or breast-bone; on the ventral surface of each of the meso- and meta-thoracic segments there are two pseudopods, while on the ventral surface of each of the first seven abdominal segments there are three pseudopods. In general appearance they are very distinct and easily recognised from other larvae. They are found living in company with the larvae of many different species of gall midges, on whose larvae they are predaceous. Usually the larvae are found singly, but sometimes two or three are found together. So far, it is found that each species of *Lestodiplosis* feeds in the larval stage on a different species of gall midge, but this may not be found good when more breeding experiments have been made.

The following description applies to any of the twenty-six species in the following keys :—

Male. Length 1–2 mm. Antennae: 2+12, 1st and 2nd flagellar segments fused, each flagellar segment with a basal subglobular node and a distal, usually

elongated, node; three whorls of circumfila, usually regular; a distinct stem separating the two nodes in each flagellar segment, and a distinct neck distally, except in the terminal segment. Palpi: 4 segments. Wings spotted or hyaline; third vein reaching costa at or just beyond the tip of wing. Claws simple, about as long as empodium. Genitalia: basal clasp segment with a basal, usually triangular, lobe on the inner side, this lobe is in some species very inconspicuous; distal clasp segment glabrous, curved; dorsal plate divided, the two lobes broadly rounded; ventral plate not divided, broadly rounded. General colour orange-red.

Female. Length 1–2 mm. Antennae: 2+12, 1st and 2nd flagellar segments fused, flagellar segments elongated, cylindrical, sometimes slightly constricted at the centre, each with a distinct long neck, except the terminal segment; circumfila with small loops or as in *Dasyneura*. Wings, legs, and general colour as in males. Ovipositor lamelliform, with two lamellae and a small ventral one at their base.

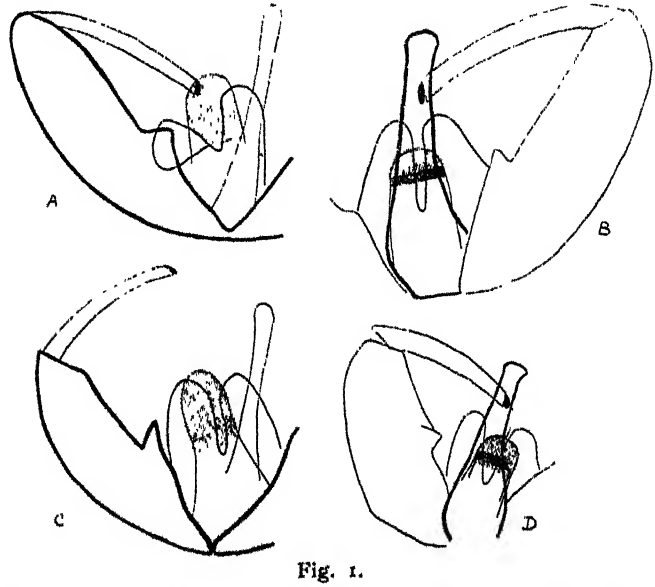


Fig. 1.

1. Genitalia of (A) *L. miki*, (B) *L. jacobeae*, (C) *L. acanthoidis*, (D) *L. traili*.

(The figures are drawn to the same scale with the aid of a camera lucida, using eyepiece 1 and lens 1/6.)

Economic Importance.

These species of gall midges are certainly beneficial, but to what extent is very uncertain. In some cases they are a very important factor in the control of other midge larvae which are serious pests, *e.g.*, in the summer of 1925 the pear midge (*Dasyneura pyri* Bouché) was doing serious damage to maiden pear trees in Essex. But from rearing experiments it was found that

only one pear midge (*Dasyneura pyri* Bouché) emerged during the period from July 14th to September 7th, while twenty-four specimens of *Lestodiplosis pyri* sp. n. and fifty-three specimens of an Hymenopterous parasite of the pear midge emerged. It will be seen from these figures that in some cases the Lestodiplosis species may be of considerable importance. But, during the period July 20th to August 7th of the following year, 1926, only one male *Lestodiplosis pyri* sp. n. emerged, while 425 (143 males, 282 females) pear midges (*Dasyneura pyri* Bouché) hatched from material freshly gathered from the same locality as in the previous year. Further, out of 867 specimens (426 males, 441 females) of *Contarinia tragopogonis* Barnes, reared in July, 1926, only a solitary specimen of *Lestodiplosis tragopogonis* sp. n. emerged. Usually, however, it would seem that, although these midges are of beneficial importance when they occur, they occur too occasionally and then too few at a time to be of great importance in keeping down the numbers of an undesirable pest. However, it may be possible to breed these predaceous midges, just as internal parasites are bred, and then free them as required.

From the limited breeding experiments that have been carried out, it would appear that the proportions of the two sexes are about equal, 107 males and 114 females having been reared during the summers of 1925 and 1926, while breeding the twenty-six species mentioned.

The following species cannot be placed in the key, as the 12th flagellar segment is missing in the preparations.

L. heterobiae sp. n.

Male. Antennae: stem of 3rd flagellar segment 1½ to 2½ times as long as broad, stem of 10th flagellar segment just under 3 to nearly 4 times as long as broad. Palpi: 3rd segment 3 to 3½ times as long as broad, 4th segment 4 to 5 times as long as broad, and under 1½ times as long as 3rd. Wings clear. Genitalia: basal clasp segment with a distinct large triangular basal lobe.

Type, Cecid. 381; paratype, Cecid. 382.

This species was bred during late June from galls of *Rhabdophaga heterobia* H. Lw., found in King's Wood, Wye, Kent, in May, 1926. In the key it falls in the group of species in which the stem of the 3rd flagellar segment is over 1½ times and not more than 2½ times as long as broad, and the stem of the 10th flagellar segment is over 2½ times and not more than 4 times as long as broad. The proportions of the 3rd palp segment separate it from *L. viburni*, *macrorosae*, and *milki*, in which the 3rd palp segment is 2 to 2½ times as long as broad. The proportions of the

4th palp segment distinguish it from *L. pini* (3½ times as long as broad), *pisi* (over 5 times), *achilleae* (2 to 2½ times), and *jacobeae* (3½ to 4½ times). There remains *L. frireni* Kieff. If *L. heterobiae* is found to have the stem of the 12th flagellar segment 3½ times and not more than 5 times as long as broad, these two species are closely allied. *L. heterobiae* may be distinguished from *L. frireni* Kieff. (Cecid. 411) as follows: in *frireni* the 4th palp segment is over 1½ times as long as the third, the basal lobe of the basal clasp segment is small and not prominent and the wings are spotted; in *heterobiae* the 4th palp segment is under 1½ times as long as the 3rd, the basal lobe on the basal clasp segment is large and prominent and the wings are clear. Further, *L. frireni* is predaceous on *C. tiliarum* Kieff. on lime, while it is presumed that *L. heterobiae* is predaceous on *R. heterobia* H. Lw. on sallow. This species may prove to be synonymous with *L. tibialis* Winn., whose larvae are predaceous on those of *R. terminalis* H. Lw.

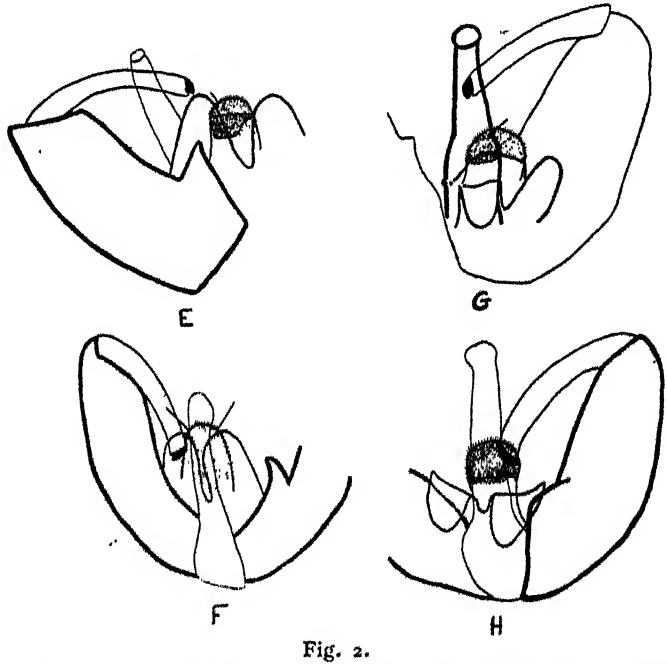


Fig. 2.

Genitalia of (E) *L. rosarum*, (F) *L. achilleae*, (G) *L. pini*, (H) *L. viburni*.

Another midge of which only the male has been reared does not show the palpi clearly in the preparations, so that its position in the key can only be approximated. Its description follows:

L. gammae sp. n.

Male. Antennae: stem of 3rd flagellar segment 1½–2 times as long as broad, stem of 10th flagellar segment about 3½ times as long as broad, stem of 12th flagellar segment 3½ times as long as broad; *basal node and distal half of neck very dark, distal node, stem, and basal half of neck pale*. Wings faintly speckled. Genitalia: with distinct basal triangular lobe on basal clasp segment.

Type, Cecid. 339.

This solitary male hatched from a *Rhabdophaga* stem gall on sallow on June 13th, 1926, from material collected in Kent the previous month. It belongs in the key to the *achilleae* and *fireni* Kieff. group, but may be easily distinguished from both these species by the very dark colour of the basal node and distal portion of the neck in each of the flagellar segments. Kieffer (1912, Marcellia, II, pp. 221-228) uses this character to divide several species into two groups: in the first group in which the basal node is black and the distal node is yellow, he places *L. septemguttu* Kieff., *cruenta* Kieff., *alternans* Kieff., and *lineata* Kieff., these midges feed in the larval stage on *Cryphalus fagi*, *Winnertzia* spp., and *Lestremine* sp. in rotten wood: in the second group he places those species which have the flagellar nodes of uniform colour.

Lestodiplosis macrorosae sp. n.

This species hatched on September 13th, 1926, from a jar containing *Phaenobremia macrorosae* Barnes, which were being reared from midge larvae sent by Miss D. J. Jackson of St. Andrews as feeding in her garden on *Macrosiphum rosae* var. *glauca* on rose leaves. It is not known definitely whether the larva of this midge was feeding on the aphides or the larvae of *Phaenobremia macrorosae* Barnes; however, owing to the usual habit of *Lestodiplosis* larvae it is considered more likely that the larva was feeding on *P. macrorosae* Barnes.

Male. Length about 1½ mm. Antennae: 2 + 12, 1st and 2nd flagellar segments fused, each flagellar segment consisting of a basal subglobular node, bearing a ring of long stout setae and one ring of circumfila with regular loops, and a distal elongated node, bearing two rings of circumfila with regular loops and a distal ring of long stout setae; each flagellar segment with a distinct stem and each, with the exception of the 12th, with a distinct neck; stem of 3rd flagellar segment about twice as long as broad, the stem of 10th flagellar segment about 3 times as long as broad, the stem of 12th flagellar segment between 3 and 3½ times as long as broad. Palpi: 4 segments, basal segment about 1½ times as long as broad, 2nd between 1 and ½ times as long as broad, 3rd 2 to 2½ times as long as broad, 4th and terminal palp segment 3½ to 4 times as long as broad, and just under 1½ times as long as 3rd. Face pale yellow. Thorax brown. Wings: hyaline, 3rd vein uniting with costa at tip of wing. Legs ochreous, claws all simple, about as long as empodium. Abdomen yellow to pale red. Genitalia: basal clasp segment, long, with slight

basal enlargement on inside face; terminal clasp segment, glabrous, strongly curved, narrow; dorsal plate deeply emarginate, lobes broadly rounded; ventral plate complete, broadly rounded; style long.

TYPE, Cecid. 303; paratype, Cecid. 301.

This species fits in the key for the separation of the male *Lestodiplosis* species just after *L. viburni* sp. n., from which it is separated by having the 4th palp segment 3 to 4 times as long as broad, whereas in *L. viburni* sp. n. the 4th palp segment is over 4½ and not more than 5 times as long as broad.

It may be distinguished from *L. rosarum* sp. n., whose larvae are predaceous on those of *Dasyneura rosarum* Hardy, by having the stem of the 10th flagellar segment over 2½ times as long as broad, whereas in *L. rosarum* sp .n. it is over 1½ and not more than 2½ times as long as broad. Further, the 3rd palp segment of *L. rosarum* sp. n. is about 1½ times as long as broad, and the 4th palp segment is also about 1½ times as long as broad, while in this species the 3rd palp segment is 2 to 2½ times as long as broad, and the 4th palp segment is 3 to 4 times as long as broad.

Lestodiplosis pini sp. n.

The larvae and pupae of this midge were received on August 12th, 1925, from Mr. H. Britten, of the Victoria University Museum of Manchester, who stated that they were predaceous on the aphides living on the bark of Weymouth Pine (*Pinus strobus*) in Delamere Forest. The midges started emerging on August 12th and continued until September 20th, 1925. It is very probable that these midges which emerged were predaceous in their larval stage on other gall midge larvae, probably *Brenia* sp., of which no adults were reared, since the larvae of the genus *Lestodiplosis* are usually known to feed on other gall midge larvae, and there is no authenticated case in which they have actually been seen to feed on aphides.

Male. Length about 1 mm. Antennae: 2+12, ochreous, 1st and 2nd flagellar segments fused, each flagellar segment consisting of basal subglobular node, with one ring of circumfila and one ring of long stout setae, and a distal elongated node with two rings of circumfila, one basal, the other distal, and a distal ring of long stout setae; the two nodes separated by a distinct stem and each, except the 12th, with a distinct neck, the stem of the 3rd flagellar segment 2 to 2½ times as long as broad, the stem of the 10th flagellar segment 3 to 3½ times as long as broad, and the stem of the 12th flagellar segment 2 to 2½ times as long as broad. Palpi: 4 segments, 2nd segment about 2½ times as long as broad, 3rd just over 2½ times as long as broad, 4th palp segment about 3½ times as long as broad, and slightly longer than the 3rd. Face dark orange. Thorax fuscous orange. Wings: hyaline, with long hairs, 3rd vein reaching the costa at the tip of wing. Legs ochreous, tarsi

darker, claws all simple, about as long as empodium. Abdomen dark orange red. Genitalia: basal clasp segment with distinct basal triangular rounded process on inner surface; distal clasp segment rather swollen at base, glabrous; dorsal plate with deep emargination, lobes broadly rounded; ventral plate complete; style long, extremity well beyond the plates.

Type, Cecid. 63; paratype, Cecid. 100, 102.

Female. Length about 1 mm. Antennae: 2 + 12, 1st and 2nd flagellar segments fused, each flagellar segment consisting of cylindrical basal enlargement, slightly constricted at centre, each bearing a distinct neck, except the terminal segment; the neck of the 3rd flagellar segment 2½ to 3 times as long as broad, the neck of the 10th flagellar segment 2 to 3 times as long as broad, and the 12th flagellar segment 2½ to 3½ times as long as broad at its base. Palpi: 4 segments, 1st segment about 1⅓ times as long as broad, 2nd about twice as long as broad, 3rd 2 to 2½ times as long as broad, and the 4th 2 to 3 times as long as broad, and slightly longer than 3rd. Wings: hyaline or faintly spotted. Ovipositor lamelliform, lobes broadly rounded. Otherwise about as in male, except that the colour is slightly lighter and brighter.

Type, Cecid. 374; paratype, Cecid. 375.

This species in the specimens so far reared has hyaline wings in the male and hyaline or spotted wings in the females. It fits in the key for the separation of the male *Lestodiplosis* species with *L. miki* sp. n., from which it may be distinguished by the 3rd palp segment being more than 2½ times as long as broad. It fits in the female key just before *L. achilleae* sp. n., which has the neck of the 3rd flagellar segment 3 to 4 times as long as broad, whereas *L. pini* sp. n. has the neck of the 3rd flagellar segment 2½ to 3 times as long as broad. Further, the neck of the 10th flagellar segment of *L. achilleae* sp. n. is 3 to 4 times as long as broad, while that in *L. pini* sp. n. is 2 to 3 times as long as broad. The palp proportions also are different in the two species. The larvae of the two midges live under totally different conditions, those of *L. achilleae* sp. n. in flowers of Yarrow (*Achillea millefolium*) and predaceous on the larvae of *Dasyneura achilleae* Kieff.; the larvae of *L. pini* sp. n. on the bark of Weymouth Pine.

Table of Species (their prey, host plant, and locality) of *Lestodiplosis* mentioned.

species.	Prey.	Host plant.	Locality.
rosarum sp. n.	*Dasyneura rosarum* Hardy	*Rosa* spp.	Kent.
traili sp. n.	,, *traili* Kieff.	*Ranunculus acris*	Kent.
pyri sp. n.	,, *pyri* Bouché	*Pyrus communis*	Devon, Essex.
miki sp. n.	,, *miki* Kieff.	*Centaurea Scabiosa*	Kent,
		,, *nigra*	Caernarvonshire; Co. Dublin.
achilleae sp. n.	,, *achilleae* Kieff.	*Achillea Millefolium*	Kent.
trifolii sp. n.	,, *trifolii* F.Lw.	*Trifolium repens*	Kent.
affinis sp. n.	,, *affinis* Kieff.	*Viola* spp.	Kent.
plicatricis sp. n.	,, *plicatrix* H.Lw.	*Rubus* spp.	Kent.

muricatae sp. n.	,,	*muricatae* Meade	*Carex* sp.	Kent.
cirsii sp. n.	,,	*cirsii* Rübs.	*Cirsium arvense*	Kent.
acanthoidis sp. n.	,,	sp.	*Cirsium acanthoides*	Kent, Co. Armagh & Tyrone.
giardi Kieff.	,,	*crinita* Rübs.	*Senecio Jacobaea*	Kent.
lanceolatae sp. n.	,,	sp.	*Carduus lanceolatus*	Kent.
pisi sp. n.	*Contarinia pisi* Winn.		*Pisum sativum*	Kent.
viburni sp. n.	,,	*viburnorum* Kieff.	*Viburnum Opulus*	Kent.
frireni Kieff.	,,	*tiliarum* Kieff.	*Tilia grandifolia*	Middlesex.
solani sp. n.	,,	*solani* Rübs.	*Solanum Dulcamara*	Kent.
jacobeae sp. n.	,,	*jacobeae* H.Lw.	*Senecia vulgaris*	Kent.
tragopogonis sp. n.	,,	*tragopogonis* Barnes	*Tragopogon officinalis*	Kent.
hieracii sp. n.	,,	sp.	*Hieracium Pilosella*	Kent.
hordei sp. n.	*Colomyia hordei* Barnes		*Hordeum vulgare*	Kent.
heterobiae sp. n.	*Rhabdophaga heterobia* H.Lw.		*Salix* sp.	Kent.
aprimiki sp. n.	*Aprionus miki* Kieff.		Rotten hazel wood	Kent.
gammae sp. n.	*Rhabdophaga* sp.		*Salix* sp.	Kent.
pini sp. n.	?		*Pinus strobus*	Cheshire.
macrorosae sp. n.	? *Phaenobremia macrorosae* Barnes		*Rosa* sp.	St. Andrews, Ross-shire.

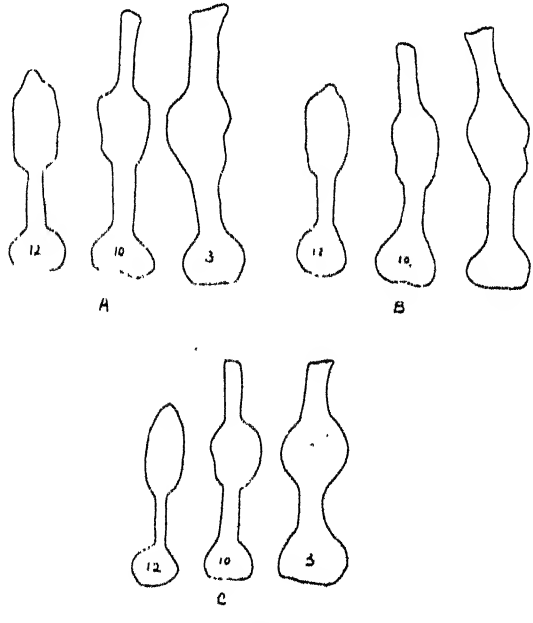


Fig. 3.

Outlines of flagellar segments of male (A) *L. pisi*, (B) *L. pyri*, (C) *L. achilleae*

(To be continued.)

FURTHER NOTES ON THE COLEOPHORINAE.

BY E. G. R. WATERS, M.A., F.E.S.

The following miscellaneous observations form a continuation of the notes published in Vol. LXIII of this Magazine, pp. 182-4.

Coleophora artemisicolella Brd. (*albicans* H.-S.). A single male example of this species, captured among mugwort (*Artemisia vulgaris*) near Little Orme's Head (Caernarvon) on August 15th, 1924, deserves to be recorded, if only for the sake of the locality. *Artemisicolella* is extremely local, the only British counties from which it has hitherto been reported being Kent, Essex and Cheshire. Another point of interest is that the antennae of this specimen are thickly ringed with rather dark fuscous from the basal joint (exclusive) to the apex; whereas the published accounts of *artemisicolella* describe its antennae either as whitish without darker rings (Herrich-Schäffer, Meyrick) or as having faint darker rings near the base only (Stainton, Heinemann and Wocke). I hesitated to identify the Welsh example of *artemisicolella* until I found specimens with similarly ringed antennae in the Bankes collection in the British Museum.

C. maeniacella Stt. (*mühligiella* Stt.). An interesting additional food-plant can be recorded for this species. On September 5th, 1926, the larvae were found abundantly in the salt-marsh at Yarmouth, Isle of Wight, feeding not only on their recognized food-plants, *Atriplex portulacoides* (*cf.* Ent. Mo. Mag., XXIV, pp. 13-14) and *Suaeda maritima* (*cf.* Mr. E. R. Bankes' record in the 'Guide to the Natural History of the Isle of Wight,' edited by F. Morley, Newport and London, 1900, p. 436), but also in plenty on *Salicornia herbacea*. Collecting batches of larvae from each plant, and keeping each batch carefully separated, I established them in flower-pots in my garden, though without much hope of rearing the moths so far from their natural habitat. The larvae on *Atriplex* came to nothing, but two imagines were bred the following summer from *Salicornia* (June 8th and 13th) and six from *Suaeda* (June 13th to 20th). The specimens are somewhat under-sized, varying from 9 to 12 mm. in expanse. Mr. E. Meyrick has kindly certified their identity. The larvae do not feed again in the spring. Revisiting the locality on April 20th, 1927, I could find only a few empty cases.

C. conyzae Z. Attention does not seem to have been drawn to the variation found in the imago of this species. Wocke, Meyrick and Spuler all describe the forewings as white, with fine brownish or yellow-brownish streaks. The examples which I bred between

June 20th and July 10th, 1927 (seven from Ventnor, Isle of Wight; one from Goring, Oxfordshire), are all remarkably dark. The head is ochreous on the crown. The brownish-ochreous markings on the veins are much broader than in typical specimens, are mixed with fuscous, especially towards the apex, and contrast conspicuously with the ground-colour. The fine lines in the cell and along the fold are brown and very distinct. The forewings would, in fact, be better described as brownish-ochreous with white markings than as white with brownish markings. One example has hardly a trace of white in the apical third of the wing, except for a partly interrupted fine longitudinal streak. The hindwings are dark grey. If the moths had not been reared from typical larvae, feeding on *Conyza squarrosa*, they might easily have been mistaken for a different species. The Bankes and British collections in the British Museum contain specimens which show the same tendency to dark colouring, but none quite so dark. Possibly the variation may be connected with the weather, which was particularly wet and gloomy during the pupal period in June, 1927; but this suggestion needs confirmation. The conditions in which the larvae were reared cannot be solely responsible, as some larvae from Portland reared under identical conditions in 1926 produced typical moths. It is perhaps worth adding that I find the larvae in spring in cases of three different sizes, from 3 to 4, 5·5 to 7, and 9 to 13 mm. long respectively. The smallest case is abandoned directly after hibernation, being found adhering to the edge of the leaf from which the medium-sized case has been cut.

C. potentillae Elisha. This species already has a long list of food-plants, chiefly Rosaceae (*cf.* Ent. Mo. Mag., LXIII, p. 74); I was therefore not surprised to find several larvae on September 27th, 1927, in the locality near Shabbington Wood (Bucks), feeding on *Spiraea Filipendula*. Within the space of a few square yards the larvae may be found on no fewer than eight different plants, including both the British species of *Spiraea*, which grow there (rather exceptionally) quite close together. Since larvae of *potentillae* sometimes occur in the same localities and on the same plants (*e.g.*, hazel, bramble and blackthorn) as larvae of *C. paripennella* Z., it is important to note that their cases, though similar, can be distinguished without difficulty. When fully formed, both cases are brown, straight, keeled beneath, and decorated anteriorly with fragments of leaf-cuticle, which the larva has removed from the underside of each successive blotch. But the case of *paripennella* is swollen in the middle and much narrowed posteriorly, has its

mouth parallel with the keel and so lies almost flat against the leaf, while the keel always bends upwards near the anal end; whereas the case of *potentillae* is a slender cylinder tapering posteriorly, has its orifice at an angle of from 30 to 50 degrees to the keel and so does not lie closely against the leaf, while the keel either is quite straight or (more often) curves slightly downwards at the anal end. The case of *potentillae* is often lighter in colour, but the colour is not a reliable criterion. It may be added that as a rule *paripennella* has the leaf-fragments plastered irregularly on the dorsal surface of the case, while *potentillae* has them arranged in a series of neat frills extending all round the case.

Unusual food-plants. A larva of *C. albitarsella* Z. was found feeding on *Prunella vulgaris* at Mickleham (Surrey) on September 30th, 1927. A larva of *C. alticolella* Wood, which is usually confined to *Juncus articulatus*, was found feeding on seeds of *Juncus conglomeratus* near Shabbington Wood on October 6th, 1927. Larvae of *C. laripennella* Zett. were common in the autumn of 1927 on some waste ground near Cothill (Berks), chiefly on *Atriplex patula*; when collecting some of these on October 13th, I came across one engaged in excavating a seed of *Polygonum Convolvulus*, which was growing among the *Atriplex*.

184 Woodstock Road, Oxford.

February 7th, 1928.

Paraneuroptera in Kent.—The following species of dragon-flies were captured in Kent in the summers of 1925 and 1926. The part of the River Medway visited was between Nettlestead, Wateringbury and Teston Lock.

Platycnemis pennipes Pall., June 1925 and 12th July, 1926, R. Medway. *Ischnura elegans* Lind., 17th June and 12th July, 1926, R. Medway; ♀-f. *infuscans* Camp., 12th July, 1926, R. Medway. *Agrion puella* Linn., June 1926, Swanton Valley, Mereworth; 6th June and 9th July, 1926, R. Shode, Basted Mills, Borough Green; 17th June, 1926, R. Medway. *Calopteryx virgo* Linn., 17th June, 1926, R. Medway. *C. splendens* Harr., June 1926; 17th June and July, 1926, R. Medway (this was the commonest species met with). *Libellula depressa* Linn., June 1925, Comp Woods, Mereworth; 26th June, 1926, Mereworth.—J. Cowley, Sidney Sussex College, Cambridge: *March 9th*, 1928.

Capture of Hammerschmidtia ferruginea Fln.—Among some miscellaneous insects sent to be by my brother, Mr. P. Harwood, while on holiday in Scotland last June is a fine specimen of this rare Syrphid. It was captured in the neighbourhood of Nethy Bridge, but my brother is unable to say under what circumstances.—B. S. Harwood: *February 23rd*, 1928.

Cratichneumon pallidifrons Grav.—I captured a ♂ of this species in the High Woods, Colchester, on May 10th, 1927. The only modern British record seems to be that by my father for the Colchester district (*cf.* Victoria History of Essex).—B. S. Harwood, Melford Road, Sudbury, Suffolk: *February 23rd*, 1928.

ON THE GENUS *ANOMIA* FIEBER, WITH DESCRIPTIONS OF TWO NEW SPECIES.

BY JAMES EDWARDS, F.E.S.

The insects forming the genus to which Fieber gave the name *Anomia* are Jassidae, having the frontal sutures not meeting above the antennae, both edges of the outer face of the hind tibae multispinose, the elytra with M unbranched and Cu 1*a* ending on the dorsum, and the wings with R and M confluent in the apical fourth. This genus is sometimes called *Typhlocyba* Germar, but from all the available evidence it is clear that Germar's genus was an assemblage equivalent to the entire Typhlocybine group, *i.e.*, Typhlocybidae Douglas & Scott, Typhlocybina Oshanin 1908.

The aedeagus with its appendages and to a lesser extent the form of the genital styles are indispensable aids to the accurate determination of the greater number of our species, but with a little practice in manipulation the examination of these parts is comparatively easy. In fresh specimens moderate pressure on the penultimate ventral segment will cause sufficient distortion to spread the genital plates and styles and force the aedeagus into view; indentification may be completed and the specimen fixed on card with a minute bead of dilute fish-glue (Seccotine). It is, however, often desirable to preserve the parts in question ready for future comparison. This may be effected in various ways; those here mentioned are very crude but quite effective so far as the essential objects, the aedeagus and styles, are concerned. The entire genital segment may be gently disengaged from the preceding segment, and if this be done by a direct backward movement very little of the contents of the abdomen will pass with the severed segment. The latter may be fastened to the card which is later to bear the insect from which it was taken with dilute fish-glue in such a manner that the sternite and the genital plates are held in firm contact with the surface of the card; push the base of the aedeagus backward until that organ assumes a vertical position, and then remove so much of the pygofer as prevents an uninterrupted view of the aedeagus. Make sure that the base of the latter is firmly held by the fish-glue so that it may not change its position as the preparation dries. If too much fluid has come away with the genital segment, the quantity may with advantage be reduced by the application of alcohol just before the pygofer is broken away, but complete alcoholic dehydration before the segment is fixed in place is not recommended. Neater preparations may be made by dismembering the genital segment in a bead of

water or glycerine on a piece of card, on which all the separated parts may afterwards be fixed along with the specimen to which they relate, the aedeagus always in a vertical position. A few hours' exposure of the material to the action of damp air will in most cases sufficiently relax dried cabinet-specimens; or the abdomen, which readily separates at the base, may be immersed in caustic potash solution and the fluid just brought to boiling point; after washing in water the specimen may be treated like a fresh one. Fluid mounts with or without pressure are necessary for the examination of details of intimate structure, but dry mounts of the kind mentioned will suffice for the separation of species so long as the criteria remain as at present.

Anomia tridentata, n. sp.

Male: crown pronotum and scutellum white, the latter with a pale red triangle on each side of the base; elytra pale yellow, becoming white in the costal third, apical cells not obviously fumose. Appendages of the aedeagus three, in approximately the same plane as the stem and directed cephalad in continuation of the curve of the latter; in the obliquely sub-dorsal aspect they appear strap-shaped acuminate sub-equal, actually they are lanceolate-acuminate, flat, sub-equal, and so placed that in the dorsal aspect one sees approximately the upper edge of the two outer and the flat face of the intermediate one. Styles elongate-acuminate, strongly bent outward before the apex. Length 4 mm.

Colesborne; one male from *Cornus sanguinea*, 12.vii.22.

Anomia complicata, n. sp.

Male: upper side white, the elytra faintly tinged with yellow on the dorsal half, apical cells not obviously fumose. Genital plates normal; styles in the sub-dorsal aspect very wide and flat in the basal half, the inner edge thence obliquely narrowed into a spine-like point; aedeagus minute, simple, a little curved cephalad, subtended caudad by two large strap-shaped acuminate plates touching or connate at the base, a little separated at the apex, and each having on the outer side near the basal third an angular notch. Length 3·75 mm.

Colesborne; one male from horse-chestnut, 10.viii.22. A minute aedeagus with large attendant plates is also found in *A. nitidula*.

The following table is intended to present the index-characters of the 37 species heretofore recorded as British:—

1. Pronotum with a spot on the disc ..... 2.
   No spot on the disc of the pronotum ..... 3.
2. Discal spot on the pronotum oval, black ..... *jucunda* H.-S.
   ,, ,, ,, ,, ,, round, orange ..... *quercus* Fab.
3. Pronotum with four or six black spots ..... 4.
   ,, unspotted or with only one spot next its front edge ..... 5.
4. Dark spot next the middle of the dorsum fuscous, never punctiform, not more intense than the remainder of the elytral markings, the latter arranged in two irregular transverse bands. Upper side pale greenish-yellow. Species lives on sallow ..... *sexpunctata* Fab.
   Dark spot next the middle of the dorsum black, more or less puncti-

form. The fuscous markings of the elytra tend to coalesce into a wide irregular stripe, and the pale ground-colour of the upper side is usually tinged with pink. Species lives on birch.
..... *betulicola* J. Edw.

5. Abdomen above in greater part black ..... 6.
,, entirely pale ..... 9.
6. R1, Rs, and Cu 1a pale throughout. Aedeagus with one branch from the base behind ..... *aurovittata* Doug.
Apices of R1, Rs, and Cu 1a black or dusky. Pronotum often with a punctiform black spot in the middle of the front edge. Aedeagus with a branch from the base on each side ..... 7.
7. Elytra white with yellow stripes ..... *tenerrima* H.-S.
,, yellow or whitish ..... 8.
8. Apices of R1, Rs, and Cu 1a black. Apex of the scutellum without a round black spot ..... *ulmi* L.
Apices of R1, Rs, and Cu 1a dusky. Scutellum generally with a round black spot on the apex ..... *debilis* Doug.
9. Elytra brownish-red with the costa broadly pale, or with distinct dark markings ..... 10.
Elytra yellow, whitish-yellow, or white, usually with the apical cells and a spot in the apex of cells R, 1st M, and Cu 1 lighter or darker fusco-hyaline ..... 15.
10. Elytra not marked with dark brown ..... 11.
,, marked with dark brown ..... 13.
11. Elytra yellow with the dorsum or the entire clavus fuscous ..... 12.
,, lighter or darker brownish-red with the costa broadly pale. Styles and aedeagus as in *A. douglasi* ..... *cruenta* H.-S.
12. Entire clavus more or less distinctly fuscous. Styles sharply pointed, curved downward about the apical fourth, on the upper side of the commencement of the curve a sharp angular tooth.
..... *gratiosa* Boh.
Dorsum only fuscous. Styles elongate-acuminate, abruptly bent outward near the apical fourth ..... *crataegi* Doug.
13. Elytra with a narrow dark brown longitudinal marking ..... 14.
,, ,, two broad blackish-brown bands, or entirely blackish-brown in the basal two-thirds ..... *nitidula* Fab.
14. A dark brown stripe along the claval suture ..... *geometrica* Schr.
,, ,, ,, streak along the dorsum. Styles and aedeagus as in *A. distincta* ..... *callosa* Then.
15. Aedeagus with appendages at the apex ..... 16.
,, without appendages at the apex ..... 34.
16. Stem of aedeagus between the bases of app. post. with a linear extension shortly cleft at its apex; app. ant. spiniform.
..... *spinigera* J. Edw.
Stem of aedeagus not produced between the bases of app. post. ..... 17.
17. More than one pair of appendages ..... 18.
Only one pair of appendages ..... 31.
18. Appendages three, sword-shaped, curving upward, sub-equal in size; app. post. porrect, sub-parallel, one on each side of the orifice; app. ant. one, from the cephalad rim of the orifice ... *tridentata* J. Edw.
Appendages four, in two pairs ..... 19.
19. ,, all undivided ..... 20.
,, of one or both pairs divided ..... 23.

20. Lower angle of pygofer produced into an obtuse blackish lobe. App. post. connate in their basal half ..... *nigriloba* J. Edw.
Pygofer entirely pale. App. post. free ..... 21.
21. App. ant. connate at the base, falcate, reaching only half as far as app. post., the connate portion having in the dorsal aspect the appearance of a short blunt extension of the cephalad side of the rim of the orifice. Species lives on alder ..... *alnicola* J. Edw.
App. ant. not connate at the base ..... 22.
22. Aedeagus much compressed laterally. App. post. wide, falcate-acuminate, nearly horizontal, spreading; app. ant. sigmoid-acute, directed obliquely downward and less divergent than app. post. ..... *rosae* L.
Appendages falcate, narrow, sub-similar, posterior pair erecto-patent, anterior pair pendent close to the stem. Species lives on Salices. ..... *salicicola* J. Edw.
23. App. post. undivided ..... 24.
" " unequally forked ..... 30.
24. " " porrect, nearly parallel. App. ant. very long, sinuate, ascending, divergent, each giving off on the inner side before the half-length a straight porrect branch which is a little curved downward in the apical fourth ..... *diversa* J. Edw.
App. post. divergent ..... 25.
25. " " straight, diverging at a right angle. App. ant. large, branched from a very short base, the branches widely divergent. *tersa* J. Edw.
App. post. sinuate or curved ..... 26.
26. App. ant. Y-shaped, large, the stem but little shorter than the branches, the lowermost branch of each Y, also the innermost. ..... *frustrator* J. Edw.
App. ant. branched from the base ..... 27.
27. Upper branches of app. ant. in the dorsal aspect enclosing a sub-circular space in which is included the lower branches, the latter separated by a narrow triangular space ..... *candidula* Kbm.
Upper branches of app. ant. otherwise ..... 28.
28. App. ant. much shorter than app. post., pincer-shaped, the branches a little approaching at the tips ..... *fratercula* J. Edw.
App. ant. longer than app. post., the branches widely divergent ..... 29.
29. App. post. directed obliquely cephalad. App. ant. like a V attached by its point, the inner branch directed cephalad and lying parallel to the long axis of the body ..... *prunicola* J. Edw.
App. post. erect. Upper branch of app. ant. directed obliquely cephalad, falcate with the concavity upward ..... *plebeja* J. Edw.
30. App. ant. furcate from a very short base, the branches falcate approaching at the tip, the upper one about one-third shorter than the lower and sometimes bearing near the middle of its upper side an erecto-patent acute tooth ..... *lethierryi* J. Edw.
App. ant. Y-shaped, spreading, the base of the Y sub-equal in length to its arms ..... *bergmani* Tullgr.
31. Appendages long, pendent, recurving ..... *pruni* J. Edw.
" not pendent ..... 32.
32. Tip of the style forming a sub-rhomboid plate having one of its free angles drawn out into a long point ..... *distincta* J. Edw.
Styles gradually narrowed to the tip, shortly before which they are

bent outward at a right angle ..... 33.

33. Appendages very short, dentiform ..... *bidentata* J. Edw.

,, thin, divergent, evenly incurved, the space between them semicircular. The stem of the aedeagus sometimes bears on each side just below the appendage an extremely slender acicular process almost two-thirds as long as the appendage and following an almost similar curve; but this supplementary process is often reduced to a mere stump ..... *avellanae* J. Edw.

34. Aedeagus minute, simple, subtended caudad by two large strap-shaped acuminate processes lying side by side, after the manner of *A. nitidula* ..... *complicata* J. Edw.

Aedeagus small, claw-like, solitary ..... 35.

35. Style widened at the apex where it has three dissimilar points. ..... *carri* J. Edw.

Style sharply pointed, curved downward about the apical fourth, on the upper side of the commencement of the curve a sharp angular tooth ..... 36.

36. Elytra deep yellow, the apical cells and a spot in the apex of cells R, 1st M, and Cu 1, fusco-hyaline; the confluence of Rs and M equal to or exceeding the length of R1 ..... *douglasi* J. Edw.

Elytra opaque white more or less tinged with yellow from the dorsum towards the costa; the confluence of Rs and M very short. ..... *opaca* J. Edw.

Considered in relation to their phallic characters our species would fall into the following groups exemplified respectively by (1) *jucunda*; (2) *quercus*; (3) *sex-punctata* and *betulicola*; (4) *auro-vittata*; (5) *crataegi*; (6) *geometrica*; (7) *callosa* and *distincta*; (8) *nitidula* and *complicata*; (9) *ulmi, tenerrima* and *debilis*; (10) *douglasi, opaca, gratiosa, cruenta*, and *carri*; and (11) the *rosae* group of eighteen entirely pale species, each differing from the other in some details of the male genitalia as well as certain plastic pigmentary characters which cannot be adequately expressed in writing within convenient limits.

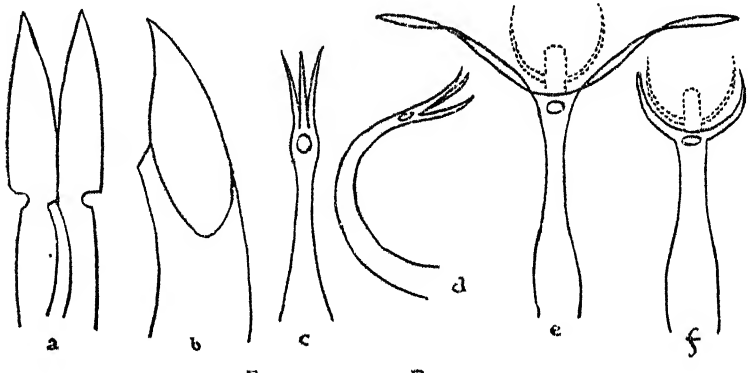
The *Typhlocyba rosae* of Dr. Singh-Pruthi ('The Morphology of the Male Genitalia in Rhynchota,' Trans. Ent. Soc., Lond., 1925, p. 212, Pl. XXVI, fig. 217), has the apex of the aedeagus surrounded by a circlet of small spines (six in the figure), and is therefore certainly not the same as the common Typhlocybine of the rose, which has always been regarded as the species of Linnaeus. *T. debilis* and *T. ulmi* of the same author (tab. cit., figs. 218, 219) are probably recognizable by means of the excellent diagrams, but nevertheless they cannot be the same as the two common insects known under those names by European entomologists.

As W. L. McAtee in his 'Revision of the American Leaf Hoppers of the Jassid Genus Typhlocyba' (Proc. U.S. Nat. Mus., Vol. 68, Art. 18, p. 42) states that the English specimens of *debilis*

received from myself are not specifically distinct from *T. ulmi* L., I think it well to refer to the reasons which have led me to regard *debilis* and *ulmi* as distinct species. *A. debilis*, as it occurs in Europe, is a whitish insect of which the majority of specimens have a black spot near the apex of the scutellum; the aedeagus is erect and laterally compressed, and has on each side of the apex at a right angle to the long axis of the body a large slender Y-shaped process of which the upper branch is often forked; on each side of the base a large strap-shaped acuminate bisinuate process, which in the cephalad aspect curves outward in its apical third and of which the tip is in contact with the lower branch of the Y; the insect lives on rosaceous trees, apple in gardens and orchards, and often swarms on *Pyrus Aria* in woods and hedgerows; its length is 3 mm. *A. ulmi* is greenish-yellow on the upper side with a fuscous band across the apex of the corium, the apical cells fusco-hyaline and the scutellum generally black or blackish; the aedeagus is moderately slender, evenly curved cephalad, the apical fourth much narrowed and divided horizontally into two elements, of which the upper is strap-shaped and truncate at the apex and the lower extends a little beyond the upper and is shortly forked at the apex; on each side of the base and following the direction of the stem a wide flat curved process about half as long as the stem and curving outward towards the apex; the insect lives on elms, and its length is 3.75-4 mm.

A. crataegi can usually be determined without reference to its phallic characters, but the species is interesting as exhibiting an unusual amount of variation in the form of the app. post., presumably owing to reduction of chitin-forming ability in the individual as the result of *castration parasitaire* or otherwise. Normally the latter are very narrow, nearly straight, and spreading (fig. *e*), but specimens are sometimes found with these parts erect, linear-acuminate, spreading at the base and afterwards straight, the included space approximately semi-circular (fig. *f*). The phallic ensemble of these two forms is at first sight very dissimilar. I have several examples from different localities with the sickle-shaped erect app. post, and a few in which the reduction of the latter has proceeded so far that only sub-erect stumps are left, but in all cases the app. ant. are normal. The latter are very characteristic, and consist of three branches from a common base; in the dorsal aspect these branches are linear-acuminate, the two outer forming the figure of a wide U and the middle one straight and about one-half as long as the others; in the lateral aspect the outer

branches are sickle-shaped, with the concavity dorso-cephalad and the middle one bluntly rounded at the apex and a little curved downward; in other words, the app. ant. are unequally branched from the base and have each short bluntly-pointed upper arm connate with its fellow.



Explanation of Figures.

a. Aedeagus and attendant plates of *Anomia complicata*, dorsal aspect.
b. Genital style of same, dorsal aspect.
c. Aedeagus of *Anomia tridentata*, dorso-cephalad aspect.
d. ,, ,, ,, ,, lateral aspect.
e. ,, ,, ,, *crataegi*, normal form, dorso-cephalad aspect.
f. ,, ,, ,, ,, aberrant ,, ,, ,,

Colesborne,
February 11th, 1928.

CORIXA DENTIPES Thompson IN LINCOLNSHIRE: AN ADDITION TO THE LIST OF BRITISH HETEROPTERA.

BY W. E. CHINA, B.A.

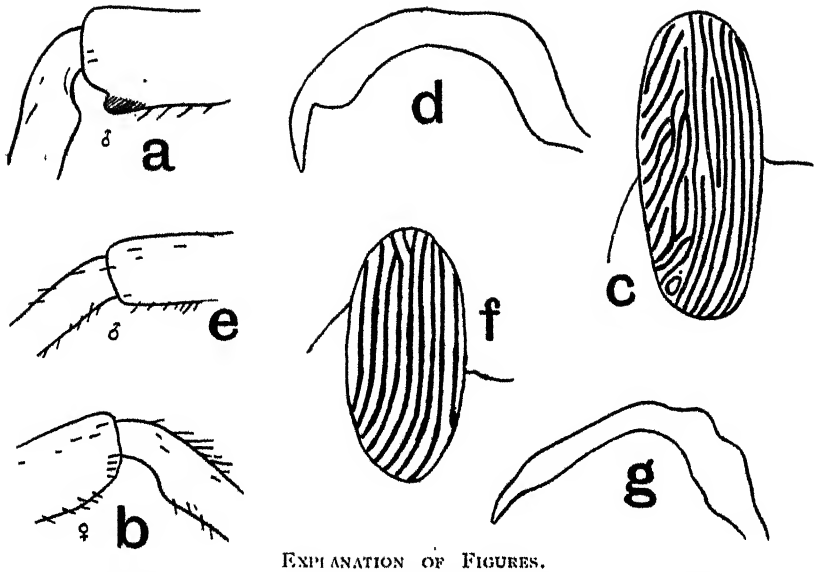
While examining the National collections in the British Museum (Natural History), Dr. Teiso Esaki noticed a single male specimen of *Corixa dentipes* Thompson amongst some British material of *Corixa geoffroyi* Leach. A careful examination was consequently made of all the British specimens of the latter species in the Museum, but no other representatives of *C. dentipes* were found. This one specimen was taken by the late Mr. J. E. Mason at Farlesthorpe, near Alford in Lincolnshire, on May 25th, 1887. Since there is no reason to doubt the validity of Mason's data (he was a well-known Lincolnshire collector residing at Alford), it has been thought advisable to place this capture on record, since the species has not hitherto been recorded from Britain.

Corixa dentipes was first described by the Swedish entomologist, C. G. Thomson, in his *Opuscula Entomologica* (fasc. 1, p. 28) published at Lund in 1869. It has been reported from Sweden, Finland, Germany, Denmark, Holland, France, Poland, Moldavia, Middle Russia, and Siberia. In general appearance this species strongly resembles *C. geoffroyi*. It has, however, recently been conveniently separated* from that species by Dr. T. Jaczewski of Warsaw in his 'Revision of the Polish Corixidae' (Ann. Zool. Mus. Polon. Hist. Nat. III, Nos. 1-2, 1924), and the following table of differences is based on his work:—

C. dentipes Thoms.	*C. geoffroyi* Leach
1. Intermediate tibia in both sexes, but particularly in the male, thickened towards the base, the inner side below the articulation with the femur, cut away in a more or less broad curve. (Fig. 1 *a* and *b*.)	1. Intermediate tibia in both sexes more or less parallel sided, the inner side towards the base not cut away in a broad curve. (Fig. 1 *e*.)
2. Intermediate femur in the male with a large bundle of strong bristles, more or less fused together in a dentiform mass, placed towards the apex on the posterior side. (Fig. 1 *a*.)	2. Intermediate femur in the male without a large dentiform bundle of strong bristles on the posterior side towards the apex. (Fig. 1 *e*.)
3. Strigil longer, with 12–14 combs of which the inner ones are regular and parallel, the outer ones broken up and confused. (Fig. 1 *c*.)	3. Strigil shorter, with 9–10 regular, parallel, combs. (Fig. 1 *f*.)
4. Left paramere (genital forcep) widened towards the apex then on the inner side suddenly constricted, and narrowed. (Fig. 1 *d*.)	4. Left paramere (genital forcep) not distinctly widened at the apex, inner side not suddenly constricted, but more or less gradually narrowed. (Fig. 1 *g*.)
5. Pala (anterior tarsus) rather more than three times as long as wide, provided with a single row of 24–28 stridulatory teeth.	5. Pala (anterior tarsus) four times as long as wide, provided with a single row of 28–31 stridulatory teeth.

It is scarcely likely that in Britain *C. dentipes* is confined to the county of Lincolnshire, and British Hemipterists would do well to look out for this interesting species in their own localities. It is not unlikely that many specimens have already been collected and are lying in collections under the name *C. geoffroyi*. On the other hand, it cannot be a common species, at least by no means so common as *geoffroyi*, since, although there are many specimens of the latter species in the British Museum, there is only one of *C. dentipes*.

* These two species, of course, had previously been separated by various authors but Dr. Jaczewski's paper has been followed as being most convenient.



EXPLANATION OF FIGURES.

Corixa dentipes Thoms. *a*. Apex of intermediate femur, and base of tibia of ♂, showing dentiform bundle of bristles, and basal excavation of tibia; *b*. same of ♀, showing difference in the degree of excavation at base of tibia; *c*. strigil; *d*. left paramere (genital forcep).

Corixa geoffroyi Leach *e*. Apex of intermediate femur and base of tibia of ♂; *f*. strigil; *g*. left paramere (genital forcep).

Figs. *a*, *b*, *d*, *e* and *g* after Jaczewski.

British Museum (Natural History),
South Kensington, S.W.7.
March 1st, 1928.

APANTELES BREVICORNIS WESMAEL: A BRACONID NEW TO BRITAIN.

BY G. T. LYLE, F.E.S.

Some considerable time ago Mr. B. S. Harwood sent to me for identification a number of examples of a species of *Apanteles* (part of a brood of thirty or so) which he had reared from a larva of *Cirrhia* (*Xanthia*) *citrago* taken near Polstead, Suffolk, in 1922. Finding that the species was unknown to me, I put the insects on one side for further study, and have only recently found time to examine them thoroughly. There can be no doubt that they may be referred to *A. brevicornis* Wesm., a species not hitherto recorded as British. The original description (Braconides de Belgique, p. 50) reads as follows :—

'Niger, palpis pallidis, femoribus anticis apice late, tibiis anticis, posterioribus basi late, rufotestaceis; abdominis (a medio ad apicem valde compressi) segmento primo et secundi dimidio anteriore rugulosis, hujus marginibus lateralibus levibus; antennis apice submoniliformibus, corpore brevioribus; terebra subexserta.'

Wesmael described the species from four females taken in the neighbourhood of Brussels; he did not know the male which is very similar, though the abdomen is shorter and not apically compressed and the antennae are rather longer than the body and head combined. The antennae of the female are two-thirds the length of the body, subincrassated, joints 12 or 13 to 17 being wider than long; palpi pale; wings hyaline, stigma pale fuscous; mesothorax finely punctulate, scutellum smooth, metathorax rugulose, carinated; first abdominal segment rugulose, *twice as long as wide*, with parallel sides, truncate, the apical angles somewhat rounded, second segment rugulose, laterally smooth, distinctly shorter than third, remaining segments smooth and very shining; the sides of the first segment are bordered with dull testaceous. Terebra shortly exserted. Length 2–2½ mm.

Marshall (Trans. Entom. Soc., 1885, p. 184) considered *A. brevicornis* Wesm., *A. praepotens* Hal. and *A. sericeus* Nees. (=*juniperatae* Bouché) synonymous. The three are, however, abundantly distinct (see my notes, Entom. XLIX, pp. 186, 206); indeed, Thomson and Szepligeti considered *brevicornis* a good species. Both *sericeus* (*juniperatae*) and *praepotens* are much larger and stouter insects, length 3–3½ mm.; in both the first abdominal segment is shorter and broader than in *brevicornis*, and the antennae, though short, are distinctly longer. The cocoons of the three species are very different; *sericeus* (*juniperatae*) makes a pale lemon-coloured cocoon, which it surrounds with a curious cradle-like structure; *praepotens* constructs a smooth, dull orange-coloured cocoon; while the cocoons of *brevicornis* are pure white, thinly covered with loose filaments and piled together in an irregular heap. *Sericeus* and *praepotens* are solitary parasites.

As will be noticed from the above description, it is difficult to place *A. brevicornis* in any one of Marshall's four sections (Trans. Ent. Soc., Lond., 1885, p. 157); perhaps it comes nearest to *A. exilis* Hal., though differing widely from that species.

Briarfield, Shebden, Halifax.
February 26th, 1928.

Amendments to the International Rules of Zoological Nomenclature.—Upon unanimous recommendation by the International Commission on Zoological Nomenclature, the International Zoological Congress which met at Budapest, Hungary, September 4–9, 1927, adopted a very important amendment to article 25 (Law of Priority) which makes this article, as amended, read as follows (*italicised type represents the amendment*; roman type represents the old wording):

ARTICLE 25. The valid name of a genus or species can be only that name under which it was first designated on the condition—

(*a*) That (*prior to January 1, 1931*) this name was published and accompanied by an indication, or a definition, or a description; and

(*b*) That the author has applied the principles of binary nomenclature.

(*c*) *But no generic name nor specific name published after December 31, 1930, shall have any status of availability (hence, also, of validity) under the rules, unless and until it is published either—*

(1) *With a summary of characters (seu diagnosis; seu definition; seu condensed description) which differentiate or distinguish the genus or the species from other genera or species;*

(2) *Or with a definite bibliographic reference to such summary of characters (seu diagnosis; seu definition; seu condensed description). And further—*

(3) *In the case of a generic name, with the definite unambiguous designation of the type species (seu genotype; seu autogenotype; seu orthotype).*

The purpose of this amendment is to inhibit two of the most important factors which heretofore have produced confusion in scientific names. The date January 1, 1931, was selected (instead of making the amendment immediately effective) in order to give authors ample opportunity to accommodate themselves to the new rule.

The Commission unanimously adopted the following resolution:

(*a*) It is requested that an author who publishes a name as new shall definitely state that it is new, that this be stated in only one (*i.e.*, in the first publication, and that the date of publication be not added to the name in its first publication.

(*b*) It is requested that an author who *quotes* a generic name, or a specific name, or a subspecific name shall add at least once the author and year of publication of the quoted name or a full bibliographic reference.

The foregoing resolution was adopted in order to inhibit the confusion which has frequently resulted from the fact that authors have occasionally published a given name as 'new' in two to five or more different articles of different dates—up to five years in exceptional cases.—C. W. STILES, *Secretary to the International Commission on Zoological Nomenclature.*

Meloe rugosus Marsh. near Oxford.—A ♂ example of this very rare 'oil-beetle' was found by Dr. J. W. Munro, of the Imperial College of Science, on a sandy path on the south face of Shotover Hill, October 16th, 1927. The specimen is now in the Oxford University Museum. Since the beetle was taken in small numbers some sixty years ago by Frederick Smith near Southend, the only records of its capture in Britain that I can find are those by the late Rev. Theodore Wood at Broadstairs (E.M.M., Vol. XXXIII, p. 259; XXXVIII, p. 286; XLIII, p. 42), and more recently by Dr. N. H. Joy at Streatley (Fowler and Donisthorpe, Col. Brit. Islands, VI, p. 300).—JAMES J. WALKER, Oxford: *March 17th*, 1928.

Dermestes attacking tobacco.—On December 3rd last year I was given a sample of tobacco leaf badly infested with *Dermestes*, two species of which were present, viz.: *vulpinus* F. and *lardarius* L. The former was very plentiful, and I counted fifty-three imagines in the sample (about one ounce); *lardarius* was rare and I only counted seven examples of the perfect beetle, though there were plenty of larvae. The majority of the larvae had a testaceous stripe on the dorsal surface, wide at the head and narrowing to the tail. These were probably the larvae of *vulpinus* as I have bred *lardarius* from larvae which were without the testaceous dorsal stripe.—EUGENE O'MAHONY, Dublin: *March 19th*, 1928.

Occurrence of Danaida plexippus L. in recent years at Oxford.—I am indebted to my friend Mr. A. H. Hamm, of the Oxford University Museum, for the following statement by a reliable observer respecting the recent appearance of this unmistakeable butterfly close to Oxford.

'*Anosia plexippus*.—This butterfly is said to have been seen almost daily for about a fortnight during September of 1926 visiting Michaelmas daisies in the nursery garden of Mr. E. W. Garden at the back of the reservoir on Headington Hill. Although not acquainted with the species, Mr. Garden was able to identify it among a collection of coloured plates of the British butterflies, and declares that a figure of *A. plexippus* was identical with the one he saw. From Mr. Garden's verbal description before he saw the plates I have no hesitation in saying that it was a specimen of the Milkweed Butterfly—L. Dawes, Headington.'

To this observation I am able to add two other occurrences of *Danaida plexippus* at Oxford in fairly recent years, the evidence for which I consider to be quite trustworthy, and have recorded them in 'The Natural History of the Oxford District' (British Association Handbook, 1926, p. 220). In 1908 the Rev. W. Mansell Merry, an experienced Lepidopterist, had a specimen of this butterfly, unfortunately too much damaged to be worth keeping, brought to him by his gardener, who had found it in a greenhouse in North Oxford and knocked it down with his cap. Two years later, in the autumn of 1910, another example was taken, also in North Oxford, on Michaelmas daisies, by a young lady, who passed it on to a Lepidopterist, Mr. Bryce M'Master. This gentleman, being well acquainted with the butterfly in Canada, naturally supposed this specimen to have been introduced by chance in its early stages, and it thus remained *perdu* in his collection until 1926, when, on learning of its great interest, he very generously presented it to me. It is a ♂ of the usual North American type, and if we accept the presumption that it has crossed the Atlantic unaided by human agency or assistance, it bears wonderfully slight evidences of its adventure, being in fine and quite unworn condition.—James J. Walker, Aorangi, Lonsdale Road, Summertown, Oxford: *March 17th*, 1928.

Pamene regiana Z. on maple.—On January 14th, 1928, I found two cocoons, containing full-fed Tortricid larvae, under the bark of a maple tree near Oxted (Surrey). In case they might produce *Pamene trauniana* Schiff., they were carefully preserved and kept in a warm place; but the imago which emerged from one of them on February 24th proved to be a typical example of *P. regiana*, while the other, which died in its pupa-case when fully developed, was also plainly that species. The occurrence of *regiana* on maple, instead of its usual food-plant, sycamore, is by no means surprising, seeing how closely the two trees are related, but does not seem to have been previously recorded.—E. G. R. Waters, 184 Woodstock Road, Oxford: *March 17th*, 1928.

The British species of Cerceris (Hymenoptera) known as C. interrupta Pz.—Mynheer B. E. Bouwman, of Bilthoven, Holland, recently wrote to me suggesting that the *Cerceris* previously recorded as British under the name *C. interrupta* Pz. was really the species known on the Continent as *C. quinquefasciata* Rossi. Examination of the British material in the Natural History Museum, South Kensington, shows this supposition to be correct; the late Rev. F. D. Morice had already placed a manuscript note in the collection to this effect. The species known as *C. interrupta* on the Continent is very distinct; the clypeus of the female is more like that of *C. labiata* F., and the abdominal fasciae are white, not yellow.—O. W. Richards, 70A Belsize Park Gardens, N.W.3: *March 12th*, 1928.

Notes on the Antennal Sensory Organs of Campodea.—Referring to the note on this subject in the March issue, the surmise of Mr. Womersley that the number of sensillae on the antennal segments III and IV is constant in the species of *Campodea* is well established. All the individuals, of whatever species, whose antennae I have at different times examined in detail, have exhibited on these segments the number of sensillae mentioned by Mr. Womersley. Not only is this the case, but the relative disposition of these on the segments, differing as it does from segment to segment, is also constant; and this fact is well illustrated by the numerous figures given by Silvestri in his many papers dealing with these insects. As these figures always show the dorsal face of the antennae, the ventral sensillae IV and V are, of course, not shown. It is remarkable that Silvestri does not show the sensory rod ('Sinnesstäbchen' of authors) on segment III, but it is scarcely probable that so experienced an observer would have overlooked such a prominent and usual type of sensory structure. This constancy among the 'species' of *Campodea* is perhaps suggestive, in view of the fact, that in the nearly related Collembola the number and position of the antennal sensory structures are regarded as important specific characters by some workers.—JAMES M. BROWN, 176 Carter Knowle Road, Sheffield: *March 5th*, 1928.

Psocoptera from Merionethshire.—In reference to my note in the January issue, Dr. W. J. Fordham calls my attention to a list of five species of Psocidae taken by K. J. Morton at Egryn, and recorded in the E.M.M. for 1902, p. 36. I regret overlooking the reference.—J. M. BROWN, Sheffield: *January 18th*, 1928.

The 'Balfour-Browne' Water-net.—I am responsible for 'The Natural History of Wicken Fen' and I gave the credit for an excellent net to Professor Balfour-Browne; apparently it was his 1*a*, not the present model 1*n*. I checked the description and it is correct with the net in question. The only alteration from the original instructions was perhaps in substituting bolting silk of 60 meshes for 25 or 30 meshes. Our old net has caught tens of thousands of specimens. Clearly the important thing lies in the use of a net with intelligence, not in the net. The question is, of course, trivial.—J. STANLEY GARDINER, Zoological Laboratory, Cambridge: *March* 1928.

[Professor Stanley Gardiner takes the responsibility for the statements in the 'Natural History of Wicken Fen' concerning what was called the 'Balfour-Browne Net,' and his explanation of the mistake is quite satisfactory, but, when he refers to 'the only alteration from the original instructions,' I feel called upon to differ from him. I never gave him or anyone else any instructions. I expect that the ring which Professor Stanley Gardiner described is probably a derelict specimen which used to hang in my room at the Laboratory. His handle-fitting is, no doubt, quite satisfactory for casual collecting, but would be useless for the strenuous work to which I put my nets. This fitting and mesh material are apparently inventions of the Zoological Laboratory, and, being in my opinion inefficient, I objected to my name being used in connection with them.—FRANK BALFOUR-BROWNE.]

Obituary.

Lt.-Col. J. W. Yerbury, R.A., F.Z.S., died on Nov. 10th, 1927, in Charing Cross Hospital, London, as the result of an accident from being knocked down by a passing motor car. He was born on March 30th, 1847, at Serampore

in Bengal, so was eighty years of age at the time of his death, and was the son of Lt.-Col. John William Yerbury of the 3rd King's Own Light Dragoons, and afterwards of Balcombe, Bradford-on-Avon. His mother was Emma Webb of Ledbury, through whom he was related to Dr. J. H. Wood of Tarrington—a well-known Herefordshire Entomologist. Yerbury was educated at Wellington College and Woolwich, and obtained a commission in the Royal Artillery in 1868. He retired in 1892 with the rank of Lieut.-Colonel after twenty-four years' service in various parts of the world. Always a genuine lover of Nature and student of wild life, he neglected no opportunity, wherever he might be stationed, of studying the local fauna of birds, mammals, reptiles and insects. Probably the work of this kind by which he will be best remembered was that on the fauna of Aden. He was stationed there for some years in the course of his military service, and published a preliminary list of the Birds of the Settlement in 1886. After his retirement in 1892 he returned to Aden for a few months in 1895 in order to complete his investigations, which were subsequently published in various periodicals—The Ibis, Journal of Bombay Natural History Society, Trans. Zool. Soc., London, Trans. Ent. Soc., London, etc. From 1895 onwards he became especially interested in the Diptera, though by no means neglecting other Orders, and was untiringly active in making collecting expeditions to scattered and out-of-the-way places in the British Isles until about 1912, when his eyesight began to fail. He felt this infliction more than most men because the study of nature was the one main interest in his life; moreover he was of too reserved a disposition to make many friends and was never married.

Yerbury accumulated no specimens himself, but freely gave the results of his collecting expeditions to those interested, and distributed duplicates to various museums. The late G. H. Verrall and the Hope Department at Oxford were especially favoured in this respect, and to the latter department he bequeathed by his will certain valuable entomological books and pamphlets. He also left a legacy to the Entomological Society of London, of which he was at the time of his death an Honorary Life Fellow, and to the Zoological Society.

Yerbury's remarkable success in adding to our knowledge of the British Fauna of Diptera will ever prevent his name from being forgotten by students of that Order of Insects, though he published very little himself except certain fauna lists, such as 'Diptera collected in Cork and Kerry during 1921,' published in the 'Irish Naturalist' for 1902, 'Diptera of Wester Ross' (Scottish Naturalist, 1912), 'Diptera of Glamorgan' (Trans. Cardiff Nat. Soc., 1918), 'Diptera recorded from the County of Devon' (Trans. Devonsh. Assoc. for Advancement of Science, 1919). These publications, however, were much more than mere 'Lists,' and contain interesting and valuable notes on many of the species. Yerbury's knowledge of the haunts and habits of the less well-known British species was exceptional, and this knowledge he was always ready to impart to those who would not abuse it by taking more than a modest series. As a companion on a collecting expedition Yerbury was at his best, and the writer of this notice will always retain happy memories of the all too few occasions when they 'took the field' together.—J.E.C.

Gervase Frederick Mathew, R.N., F.L.S., died on February 10th at Lee House, Dovercourt, Essex, on the eve of his 86th birthday. He came of a well-known North Devon family, which included more than one naturalist of repute, and his entomological career began at an early age. Already, from 1857 onwards, we find him sending valuable notes to the 'Entomologist's Weekly Intelligence' on the Lepidoptera and Coleoptera of the Barnstaple district, and in all probability he was the last surviving contributor to this periodical, so useful in its day. We find his name, too, subscribed to a short note in the

first volume of our own Magazine (p. 116), written when serving in H.M.S. *Warrior*, the first of our 'ironclads.'

In 1861 he entered the Royal Navy as a clerk, and his long and meritorious career came to a conclusion in 1902 with his retirement with the highest rank in his branch of the Service, that of Paymaster-in-Chief. Throughout this long period of active employment, which included prolonged commissions on the Pacific, Australian, and Mediterranean Stations, he availed himself to the full of such opportunities for the study of Natural History as came in his way, though he concentrated mainly on the Lepidoptera, of which he made large collections on every voyage. His persistence and enthusiasm in these pursuits (as in the case of a contemporary Naval Entomologist) elicited much good-humoured banter from his fellow officers; and the journals which he kept without a break from the date of his entering the Navy until the beginning of his last illness in 1925 must contain a vast store of valuable scientific observations, though his published writings are not as numerous as might have been expected. On his retirement he settled at Dovercourt, near Harwich, where the final years of his active service had been passed, and he continued to work this highly productive district with characteristic energy until well past his eightieth year, as well as devoting much time and skill to the rearing of Lepidoptera. It was here that as long ago as 1886 he first met with the very distinct *Leucania* described in our pages in 1895 by C. G. Barrett under the name of *L. favicolor*, the life-history of which species Mathew detailed ten years later in our 41st volume. His fine local 'strain' of *Arctia villica*, with greatly enlarged apical spots in the fore-wings, is also well known among Lepidopterists.

Mathew joined the Entomological Society of London as long ago as July 1865, served on the Council in 1887, and at the time of his death was one of the two Senior Fellows, the Rev. A. E. Eaton, happily still with us, having been elected on the same day. A year previously, in March 1864, he had been elected a Fellow of the Linnean Society, of which only one Fellow of longer standing survives him. For many months previous to his decease he was bed-ridden and nearly helpless, and now Entomologists have to deplore the loss of a genial and able colleague. We tender our sincere sympathy and condolence to his widow. —J.J.W.

Society

Entomological Society of London: *Annual Meeting, January 18th*, 1928 — Mr. J. E. Collin, President, in the Chair.

Dr. Neave read the Report of the Council, which was adopted on the motion of Mr. G. Wheeler, seconded by Mr. C. J. Wainwright.

The Treasurer, Mr. W. G. Sheldon, read his Report, and this, together with the Accounts for the year, were adopted on the motion of Dr. K. Jordan, seconded by Mr. R. W. Lloyd.

The President announced that the Fellows nominated as Officers and Council for the ensuing year had been duly elected.

The President read his Address, after which a vote of thanks to him, coupled with the request that the Address might be published in the Proceedings, was moved by Mr. E. E. Green, seconded by Mr. R. Adkin, and carried unanimously.

A vote of thanks to the Officers for their services was passed on the motion of Sir T. Hudson Beare, seconded by Mr. Hugh Main, and carried unanimously.

Mr. W. G. Sheldon, Dr. S. A. Neave, and Mr. N. D. Riley briefly replied.

Wednesday, February 1st, 1928.—Mr. J. E. Collin, President, in the Chair.

The President announced the death of Mr. J. H. Durrant, and a vote of condolence with his relatives was passed.

The death of Mr. G. Bethell was also announced.

The President announced that he had nominated Mr. R. Adkin, Mr. H. M. Edelsten, and Mr. R. W. Lloyd as Vice-Presidents for the coming year.

The following was elected a Fellow of the Society:—A. W. McK. Hughes, 22 Stanford Road, Kensington, W.8.

Capt. A. F. Hemming exhibited a series of *Maniola lupinus* Costa, a species not previously recorded from France, and described a new subspecies. Dr. V. B. Wigglesworth discussed 'Impressionist Colouring among Lepidoptera.' Mr. H. E. Edelsten communicated a description of the larva of *Microsphinx pumilum* sent by Mr. G. Edelsten from the Orange Free State. Professor E. B. Poulton, F.R.S., communicated further observations by Dr. G. D. H. Carpenter on insects in Uganda. He also discussed further observations on the fertilization of *Ophrys fusca*, by Colonel Godfrey and others. He exhibited living larvae of an Ascalaphid from Nairobi, and a green female of *Mimetica tuberata* from Costa Rica. Mr. A. Dicksee exhibited seven examples of blue *Agrias* from Colombia. Mr. T. A Barns gave an account, illustrated with lantern slides, of the insect fauna of the Guinea Isles.—S. A. Neave, *Hon. Sec.*

FURTHER NOTES AND DESCRIPTIONS OF NEW BRITISH *THYSANOPTERA*.

BY RICHARD S. BAGNALL, F.R.S.E., F.L.S.

My last paper on British Thysanoptera appeared in this Magazine for December, 1926. Since that date I have published three parts of a series of papers on European Thysanoptera (Ann. Mag. Nat. Hist., 1926, Ser. 9, xviii, pp. 641-661; 1927, Ser. 9, xix, pp. 564-575, and xx, pp. 561-585), in which several of the species now recorded as British were first described.

Limothrips incertis Bagn., *L. minor* Bagn., *Odontothrips anthyllidis* sp.n., *O. inermis* sp.n., *Physothrips montanus* Karny, *P. trybomi* Karny, *P. flavus* sp.n., *P. inaequalis* sp.n., *P. friçi* Uzel, *Thrips albipes* Bagn., *T. alni* Uzel, *T. difficilis* Pr., *T. origani* Pr. (=*dyssochaetus* Bagn.), *T. dorsalis* Bagn., *T. pillichi* Pr., *T. frankeniae* Bagn., *Baliothrips exilis* sp.n., and *Phloeothrips immanis* Bagn., are additions to the British fauna. I am indebted to my friends Mr. H. Britten and Mr. Guy Morison, the former for his energy and discrimination in finding several of the novelties described below, and the latter for his careful measurements of *Odontothrips inermis* and *Baliothrips exilis*.

Limothrips incertis Bagn.

1926 Ann. Mag. Nat. Hist., Ser. 9, xviii, p. 642, figs.

Allied to *L. denticornis* Hal., the female being less heavily built and having the antennal joint 3 less acutely produced and 4 and 6 subequal, or with joint 6 but slightly longer than 4, whereas in *denticornis* 6 is noticeably longer than 4, which latter joint in that species is markedly asymmetrical in form. The postero-angular pronotal bristle is shorter than in *denticornis*, the abdom-

inal bristles on segment 9 are as long as (or slightly longer than) in *denticornis*, and those on 10 weak and distinctly shorter, whilst the spines on both segments are longer and less stout than in *denticornis*. The characters of the third antennal joint and the short stout papilla-set lateral spine of the chitinous band in abdominal segment 9 of the ♂ as figured (l.c., p. 643) are distinctive. The species is described from examples taken on both the French and Spanish side of the Eastern Pyrenees, and I have a single ♀ example from Leith Hill, Surrey, found with *L. schmutzi*, 2.v.1926.

Limothrips minor Bagn.

1927 Ann. Mag. Nat. Hist., Ser. 9, xx, p. 565.

♀ A smaller, more slender and less darkly coloured species than *L. cerealium*, distinguished by its shorter legs—the length (and breadth) of tibia III being 135-150 (40) as compared with 195 (62) μ in *cerealium*), the shorter antennal joints, especially 3, the narrower wings and shorter bristles and setae. The interocellar and antero-angular pronotal setae are 16-20 and 38-50 μ long, as compared with 34 and 68 μ in *cerealium*; the longest abdominal bristles on segment 9 and the inner pair on 10 are 130-150 and 62-65, compared with 170-190 and c.95 μ, whilst the wing setae are also noticeably shorter and finer than in *cerealium*. The relative lengths (and breadths) of the antennal joints 2-8 are approximately :—

L. cerealium. 38 (31) : 54 (26) : 41 (23) : 41 (22) : 60 (21) : 13 (9) : and 16 (6)μ.
L. minor. 38 (27) : 43 (22) : 38 (21) : 38 (21) : 54 (19) : 12 (8) : and 14 (5·5)μ

I have three British examples, all ♀♀, as follows: OXFORD (on *Euphorbia*) and KIRTLINGTON PARK near Oxford, ix, 1913; and PEASLAKE, Surrey, ix, 1925.

It is apparently common in the Mediterranean area.

Odontothrips inermis sp. n.*

♂. Length about 1·3 mm., breadth of mesothorax 0·27 mm., slender.

Belonging to the section in which the fore-tarsus is armed, but differing from all others of that section by the total absence of the fore-tibial teeth.

Colour brown; antennal joint 3 and all tarsi yellow; fore-tibiae yellow, lightly shaded with grey-brown; intermediate and hind-tibiae yellowish at knees; antennal joints 4 and 5 with a narrow dark basal ring and a short prae-basal light area; joint 8 apparently paler than 7. Wings grey-brown except for a short pale area near base.

Head transverse, about 1·25 times as broad as long; interocellar bristles as long as the eye (c. 85μ); two pairs of anteocellar setae and the postoculars near the cheeks prominent. Antennae long and slender, nearly 2·4 times as long as the head with the relative lengths (and breadths) approximately as follows: 26 (32) : 43 (26) : 68 (23) : 61 (22·5) : 41 (17·5) : 59 (20) : 11·5 (9) : 16 (7)μ.

* Since receiving proof Mr. Britten has tentatively suggested that this may be the ♂ of *O. mutabilis* in which section it comes. In view of its slender form, the more slender antennae and the unarmed fore-tibia it would be unsafe to so regard it without material of both sexes from the same locality.

Pronotum transverse, slightly longer than the head and 1·6 times as broad as long (142 : 228μ); the inner postero-angular bristles longer than the outer (c. 80μ) and about 0·6 the length of the pronotum. Posterior margin with 3–4 pairs of minor setae in addition to the median pair which are about 37μ in length.

Fore-wing a little more than fourteen times as long as broad near middle (930 : 65μ); wing setae somewhat long and fine, costa furnished with 27–29, lower vein 13–14, and upper vein with a basal series of 4 (the first of which is noticeably shorter than the others), and 15+2 (or 15+1+1).

Abdomen elongated and narrow, tergum 9 with the hind margin medianly strongly emarginate with a tooth-like process (more than 20μ long and about 13μ wide at base) at each side of which appears to be up-curved; there are 3 pairs of dorsal bristles, the inner pair of which are short and spine-like on a plane above each process. The length of the longest bristle on this segment is about 130μ. Comb of tergum 8 weak medianly.

Length (and breadth) of tibia approximately: I. 130 : 50, II. 140 : 46, and III. 206 : 42μ; fore-tibia without apical teeth, but with a short slender spine at apex within.

Although this species comes in a different group it can only be compared with *Odontothrips edentulus* of Priesner, from which it may be known by the presence of the fore-tarsal tooth, the coloration of the antennae, which are more slender and have joint 5 distinctly shorter, the comparison of joints 3-8 being as follows:—

O. inermis m. ♂. 68 (23) : 61 (22·5) : 41 (17·5) : 59 (20) : 11·5 : 16μ.
O. edentulus Pr. ♀. 70 (25) : 64 (24) : 50 (22) : 64 (24) : 11 : 18μ.

CHESHIRE, Delamere 1 ♂ on *Ulex*, 25.viii,25 (H. Britten).

Odontothrips anthyllidis sp.n.

This species is closely related to *O. loti* Hal., but may be separated at once by the longer antennae and the relative lengths of the antennal joints 3, 4 and 6. In *loti* joint 4 is shorter than 3 and never longer, and nearly always shorter than 6, whilst in *anthyllidis* 3 and 4 are approximately subequal and 6 is invariably shorter than 4. The following is the average length in a large number of counts of joints of 3 to 6:—

O. anthyllidis, sp. n. 70 : 67·5 : 40·5 : 50·5μ.
O. loti Hal. 60·5 : 54·8 : 37 : 57·2μ.

the long fourth joint making a somewhat easy character. The spine at apex of fore-tibia is situated on a more prominent stumpy production than in *loti*, whilst the series of bristles of the upper vein of the fore-wing do not make a break in the distal third as in *loti*. The bristles at end of abdomen are distinctly longer in *anthyllidis*, the longest on segment 9 being 180-200, as compared with 150-160 μ in *loti*.

♂ Unfortunately I have only one dorsally mounted example of each species. In *loti* the posterior margin of tergite 9 is produced in the form of a tooth near each side (fig.), whilst the median pair of dorsal spine-like bristles are 24-27μ in length and close to-

gether, separated by about 22μ. In the example of *anthyllidis* I can determine no such postero-marginal productions on tergite 9, whilst the dorsal bristles appear to be shorter and are much more widely spaced, being separated by 52 μ.

Found on *Anthyllis Vulneraria*.

SCOTLAND, near Aberdeen, August 1925. ENGLAND: BEDFORDSHIRE, near Biggleswade, June 1920; YORKSHIRE, Speeton, July 1924; and SURREY, Coulsdon, June 1925.

Odontothrips phaleratus Hal.

1924 *Odontothrips anisomerus* Bagnall, Ent. Mo. Mag., lx, p. 271.

I have taken *O. anisomerus* throughout this country and in Switzerland, France and Spain, and am forced to the conclusion that it must be the *O. phaleratus* of Haliday and of European authors, the unusual form of the 3rd antennal joint and the long space in the upper vein of fore-wing devoid of setae being ignored or overlooked by previous authors. The fore-tarsus is without tooth.

Odontothrips mutabilis Bagn.

As I cannot agree with Priesner's synonymy regarding his *meridionalis*, I must set out my reasons. In 1919 Priesner characterised as *O. ulicis* var. *meridionalis* a form found in Albania on *Spartium* with the following short description: 'Von *ulicis* Hal. durch rudimentären Zahn an den Vorderschienen und ganz dunkles 4 Fühlerglied verschieden und vielleicht species.' Cotypes he was good enough to send me show that the species is not only smaller than later examples labelled *meridionalis* he sent me from other countries and plants, but has the 8th tergite absolutely devoid of 'comb' except for indications of a minute and rudimentary nature at each side, as in my *ignobilis*, whereas the other examples are larger and have a coarse and easily distinguished comb except medianly, thus approaching and apparently the same as the still more robust English form I described under the name of *mutabilis*. All my own examples collected in Italy, Spain and France are of this second form, and I submit the following synonym:—

Odontothrips meridionalis Priesner.

1919 (Mar. 13th). *O. ulicis* Halid., var. *meridionalis* Priesner. Sitzgsb. Akad. Wiss. Wien., cxxviii, p. 122.

1919 (Oct. 1st). *O. ignobilis* Bagnall. Ann. Mag. Nat. Hist., Ser. 9, iv, p. 262.

Odontothrips mutabilis Bagn.

1924 Ent. Mo. Mag., x, p. 271 = *meridionalis* Priesner in part.

Only *mutabilis* can as yet be regarded as British.

Oxythrips quercicola Bagn.

On *Quercus*, females only, GIBSIDE, Co. Durham, and CRIEFF, Perthshire, June 1927.

Physothrips trybomi Karny.

A yellow form that Priesner regards as a variety of *vulgatissimus*. It also agrees closely in general form with *Thrips flavus* (vide *Physothrips flavus* below!), but has the antennal joints 4-6 of a uniform brown colour. The female example now recorded agrees well with an example of *trybomi* given to me by Priesner.

E. DEVON, Lynmouth, near Watersmeet, 1 ♀ on *Alnus*, 31.vii. 1913.

Physothrips flavus sp.n.

Like *Thrips flavus* but with a short two-jointed style. I have only twice seen examples with both antennae having the styles 2-jointed as recorded below.

Co. DURHAM. One female taken near Winlaton many years ago. A ♂ from Delamere, CHESHIRE, 9.viii.25, on *Epilobium angustifolium* (H. Britten) recently received is almost certainly the ♂ of this form, and not of *trybomi* as I had at first suspected.

Physothrips montanus Priesner.

This species has the head formed more as in *Taeniothrips primulae* than in *P. atratus*; the third antennal joint is paler than the following, not unicolorous as in *atratus* or light yellow as in *annulatus*, whilst there are only 5-6 (rarely 7) bristles in the distal part of upper vein of the fore-wing.

ENGLAND, LANCASHIRE, Reddish Vale, 13.ix.1917, 1 ♀ and 1 ♂ on Devil's Bit Scabious (H. Britten).

Physothrips friçi (Uzel).

ENGLAND, DEVONSHIRE, 1 ♀ with *Thrips physapus* in the head of a Composite, Tors near Ilfracombe, Aug. 1912; SUSSEX, 1 ♀ by general beating, Eastbourne, October 1927.

Physothrips inaequalis sp.n.

♀. Length about 1·3 mm., breadth of mesothorax c. 0·32 mm. Abdomen dark brown, head and thorax yellowish-brown, the pterothorax darker, especially laterally; femora somewhat lighter than the thorax with yellow tibiae lightly touched with grey-brown; fore-wings of a uniform greyish yellow, setae dark: antennae with joint 2 basally and joint 5 distally and 6–8 light brown, 1, 2 distally, 4 and 5 basally paler. Head strongly transverse, 108 (170)μ; eyes black, ocelli with carmine crescentic hypodermal pigmentation; maxillary palpi with the distal joint long and slender, the relative lengths (and breadths) of the joints being 13 (11) : 12 (7) : 19 (5)μ. Postocular and anterocellar microsetae moderately long, for the most about 16μ; interocellar pair short, dark and rather stout, c. 64μ long and situated close to the anterior ocellus. Antennae comparable—

except for the very long sixth joint—to those of *P. setiventris* Bagn. (an Indian Tea thrips) and having the whorls of minute microsetae as in that species: joint 5 subequal in length to 4 and 6, 1·5 times as long as 5, the relative lengths of the segments 2–8 being approximately as follows:—

38 (27) : 49 (24·5) : 44 (22) : 43 (20·5) : 66 (20) : 10 (9) : 15 (6)μ.

The sense trichomes on 3 or 4 are much as figured for *P. setiventris;* joint 6 is narrowed in its distal half and has a long slender sense-cone seated near the middle of the outer margin which reaches to a line with the apex of the segment. Pronotum transverse, 1·2 times as long as the head and nearly 1·7 times as broad as long (130 : 216μ); postero-angular bristles up to 0·5 the median length of the pronotum (58–66μ), stout, dark; inner series of postero-marginal microsetae consisting of three pairs ranging from 20μ in length outmost to 30μ for the inmost. Legs normal: fore-wings having the costa and hind vein furnished with 27 and 13 setae respectively, the latter near middle being c. 50 or about 0·75–0·80 the breadth of the wing; upper vein with 1+1+1 in the distal half.

Abdomen elongate ovate, not much broader than the pterothorax; apical bristles somewhat long and dark, the longest on segment 9 about 114 and the inmost 92μ, whilst those on 10 are 94–98μ. The 'comb' of tergite 8 is broken for a median space but developed at each side.

YORKSHIRE, Tadcaster, in flowers of *Tamus* with *Anaphothrips tamicola* Bagn., June 1920, 2 ♀ ♀. The exceptionally long sixth antennal joint makes it a very distinctive species.

(To be continued.)

QUEDIUS NEMORALIS BAUDI NEW TO THE BRITISH LIST, WITH NOTES ON ALLIED SPECIES.

BY B. S. WILLIAMS.

In my previous note (*antea*, p. 53) I dealt with *Quedius humeralis* Stephens: the effect of that was to give validity to Kiesenwetter's name of *suturalis*, which had hitherto been sunk as a synonym of *humeralis* Steph.

The object of the present paper is to establish the identity of the species standing in our lists as *humeralis* Steph., and *obliteratus* Er. It is my pleasant duty to acknowledge here my indebtedness and gratitude to Dr. Gridelli, of Genoa, as it is owing to his kindness in examining our species and supplying me with a type of *Quedius suturalis* Kies. that I am in a position to do so.

Before proceeding to discuss the species, it will be as well, perhaps, to say that they are very closely allied, the external characters being comparative, and so, without specimens of each, cannot be appreciated. As against this, the aedeagi are abundantly distinct and are safe guides, in the males, to identification.

In describing the aedeagi I have termed the larger and bulbous portion the 'main' lobe. This corresponds to the lateral lobes of the usual Staphylinid type of aedeagus, which in some genera, including *Quedius*, are fused into one piece; for the smaller or

accessory lobe, corresponding to the median lobe, I have used the term 'parameron.' In order to appreciate the formation of these two parts they have been separated from each other other, and their inner, or touching, surfaces are described in the table and figured below. The widened basal end of the parameron has been disregarded in the descriptions.

Quedius suturalis Kies.

I know of no British specimen of *suturalis*, but nevertheless it will be as well to include the species in these notes as the name has figured in our lists for many years, generally with *humeralis* Steph. as a synonym*: moreover this may lead to its being established as one of our fauna. Apart from the aedeagus, *Q. suturalis* may be distinguished from the two following species by its broad head and coarser elytral puncturation.

Quedius obliteratus Er.

This species was firmly established as British by Mr. J. H. Keys (E.M.M. 1902, p. 147), to whom I am indebted for my specimens. In order that there should be no mistake as to the identification, I sent a male to Dr. Gridelli, who confirmed its identity. It had previously been determined by Fauvel (*loc. cit.*). Dr. Gridelli informed me that Fauvel was the only author who knew this species, the rest confusing it with, and applying its name to, *Q. nemoralis* Baudi.

This species is much scarcer with us and more local than the following one, being found chiefly in the South of England, and, judging from the data of specimens I have seen, seems to favour habitats not many miles inland.

Quedius nemoralis Baudi.

This species is an addition to the British List, and will be found in most, if not all, of our collections doing duty for one or both of the previous species. In can be separated from *Q. obliteratus* by its somewhat coarser and more sparing elytral puncturation, and generally by the more convex appearance of the elytra, though this latter character is not absolutely reliable as I have an undoubted male with elytra flattened as in *obliteratus*. It is more generally distributed that *obliteratus*, frequently occurring in heaps of roadside trimmings and dead leaves. I have found it in traps composed of dried grass set in the runs of *Lasius fuliginosus*: in this case it seems probable the cover offered by the dried grass was the attraction, and not the ant.

* This order was reversed in the Newbery and Sharp List (1915) where we find *humeralis* given as the species and *suturalis* (Brit. Cat.) as the synonym.

The following table may prove useful for identification purposes :—

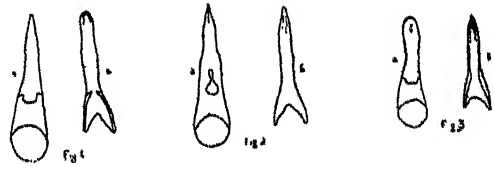
1 (2) Outline of head (including eyes and excluding mandibles) broad, in shape a transverse oval. Elytral puncturation coarser. Aedeagus with apex of main lobe sharply acuminate, without median carina (fig. 1*a*). Parameron with its sides slightly dilated in middle for about one-third of its total length. Apex bluntly rounded, bearing two short, slightly irregular rows of black tubercles which are placed close to the edge and are parallel to the outline (fig. 1*b*) ..... *humeralis* Kies.

2 (1) Outline of head (including eyes and excluding mandibles) narrower, in shape orbicular. Elytral puncturation finer.

3 (4) Elytra somewhat flattened, more finely and closely punctured. Aedeagus with apex of main lobe sharply acuminate and bearing a distinct median carina (fig. 2*a*). Parameron parallel sided, apex acuminate, bearing two straight, parallel rows of slightly irregularly placed black granules situated close to the longitudinal axis (fig. 2*b*).
..... *obliteratus* Er.

4 (3) Elytra somewhat convex; more strongly and less closely punctured. Aedeagus with apex of main lobe dilated and rounded, bearing a raised black tooth in the centre of apex (fig. 3*a*). Parameron parallel sided, apex acuminate, the pointed portion being thickly studded with black granules except for a narrow space down the middle (fig. 3*b*).
..... *nemoralis* Baudi.

In conclusion I wish to express my best thanks to Dr. Joy for his kindness in drawing the camera lucida figures of the aedeagi, and to Messrs. P. Harwood and J. H. Keys for their assistance.



Explanation of Figures.

Fig. 1. Aedeagus of *Q. suturalis* Kies. (from a Continental specimen). (*a*) main lobe, (*b*) parameron.

Fig. 2. Aedeagus of *Q. obliteratus* Er. (*a*) main lobe, (*b*) parameron.

Fig. 3. Aedeagus of *Q. nemoralis* Baudi. (*a*) main lobe, (*b*) parameron.

15 Kingcroft Road, Harpenden.
March 22nd, 1928.

Prionocyphon serricornis Mull., an Irish Beetle.—Recently Mr. A. W. Stelfox gave me some Coleoptera collected by him in the Deerpark, Powerscourt, Co. Wicklow, on August 3rd, 1927. One of these proved to be a male *Prionocyphon serricornis* Mull., a species not hitherto recorded as occurring in this country.—Eugene O'Mahony, National Museum of Ireland, Dublin: *April 5th*, 1928.

COLEOPTERA FROM THE KILLARNEY DISTRICT OF COUNTY KERRY, IRELAND.

BY EDWIN BULLOCK.

The following list of Coleoptera captured by me in this district includes over sixty species and varieties that apparently have not yet been recorded from Ireland. Amongst these are five forms new to the British Isles. Two of them are undescribed varieties, which I propose to introduce as such.

I am greatly indebted to Lieut.-Col. Deville for identifying the *Coccinella* and the *Cassida* for me, and for his valuable assistance in looking up the Continental literature bearing on the species, of which the Irish varieties now brought forward are, as he assures me, quite unknown to him, and he suggests that they are certainly worthy of distinctive names.

Bradycellus sharpi Joy. Common in the district.

Bembidium lampros var. *velox* Er. Lower Lake shore, running about on dry mud.

Acilius sulcatus var. *scoticus* Curtis. This melanic variety occurred fairly common in small pools at the bottom of a large sand pit.

Laccobius regularis Rey. One specimen only, in a pool on boggy ground.

Oxypoda pectita Sharp. Shaken out of flood refuse from the Lower Lake.

Ocyusa maura Er. Common in wet moss in the surrounding woods.

Calodera protensa Mann. Fairly plentiful from flood refuse from the Lower Lake.

Atheta validiuscula Kr. Very common in fungi in woods in late Autumn.

A. vilis Er. Swampy ground near Lake shore.

A. mortuorum Th. On wet ground near Lake shore.

Gyrophaena fasciata Marsh. In fungi in woods.

G. bihamata Thoms. In fungi, rare.

Philonthus varians var. *agilis* Gr. A few specimens at various times. In the Johnson and Halbert list of the Beetles of Ireland this was deleted from the Irish List, so I am very pleased to be able to reinstate it.

Gabrius appendiculatus Sharp. Rare, in flood refuse from the Lake shores.

G. pennatus Sharp. Common in the whole district.

G. stilpes Sharp. Very rare.

Stenus providus var. *rogeri* Kr. A few from river refuse.

Deliphrum crenatum Gr. This northern species is fairly common in decaying fungi on trees in woods throughout the whole district, occurring frequently in the late Autumn months.

Omalium exiguum Gyll. In moss on an old stump, one specimen.

O. caesum var. *tricolor* Rey. Common in refuse, in my garden.

Clambus pubescens Redt., *C. minutus* Stm., and *C. punctulum* Beck. In flood refuse.

Agathidium atrum Pk. By sweeping reeds.

Neuraphes rubicundus Muls. Three specimens, at various times, under bark on decaying trees.

Bryaxis impressa Panz. One under a stone close to the Lake shore.

Euplectus bescidicus Reitt. In an old tree riddled with the burrows of *Sirex gigas*.

Pteryx suturalis Heer. In wet moss in swampy wood close to Lake shore.

Ptinella aptera Guér. Under bark of old decaying trees.
Hister succicola Th. One specimen in a dead rabbit.
Acritus nigricornis Hoff. In old trees.
Epurea immunda Er. A few specimens taken on flowers of Umbelliferae.
E. parvula Stm. Crawling about on freshly cut logs.
Meligethes difficilis Heer. By general sweeping.
M. brunnicornis Stm. By sweeping in a grassy clearing in a wood.
M. bidens Bris. By sweeping.
Cerylon fagi Bris. Crawling on a log.
Ips quadriguttata F. Two specimens from under bark.
Lathridius bergrothi Reitt. Common in a house in the town.
Cartodere filiformis Gyll. A nice series secured by shaking old mats from an old lumber room. This was erroneously recorded from Ireland and deleted in the Johnson and Halbert list of the Irish Beetles so I am very pleased to be able to reinstate this species.
Melanopthalma similata Gyll. By sweeping.
Hemoticus californicus Mann. In an old house.
Cryptophagus punctipennis Bris. In refuse in an old house.
C. umbratus Er. In refuse.
Aphodius ater ab. *terrenus*. A few only.
Telephorus figuratus var. *cruachanus* Chitty. By sweeping in the woods at Derrycunihy in the Upper Lake region.
Cis villosulus Marsh. In an old stump.
C. fuscatus Mel. In dry fungi on rotten wood.
Ennearthron cornutum Gyll. In fungi on rotten wood.
Cryptocephalus pusillus F. By brushing young trees close to Ross Castle.
Phyllodecta cavifrons Th. One specimen by sweeping. Recorded in error from Co. Kerry (H. Donisthorpe *in litt*).
Longitarsus ferrugineus Foud. By sweeping.
L. atriceps Kuts. By general sweeping.
L. gracilis var. *poweri* Allard. By sweeping.
Uphitobius piceus Ol. In a flour store.
Cistela luperus var. *ferruginea* F. A few by brushing young trees close to Ross Castle.
Dorytomus agnathus Boh. By brushing young willows.

Haliplus confinis Steph., var. *halberti*, var. nov.

I propose to name this form after my friend, Mr. J. N. Halbert, late of the Science and Art Museum, Dublin, who has been for many years my mentor in the study of Coleoptera.

In this variety the head and thorax are testaceous, the elytra black with a few very short narrow testaceous lines, and the reflexed margins of the elytra testaceous.

Locality.—Clear water of the Lower Lake, Killarney.

Rybaxis longicornis Leach, var. *nigropygialis* Fairm.

The late Canon Fowler mentions this variety in his Supplementary Volume (Col. British Islands, VI, p. 340) as probably to be found in England. I am pleased to be able to state that it is fairly common in this district. This form is entirely light red, with the abdomen sometimes darker.

Coccinella (*Calvia*) *decemguttata* Linn.

I took one specimen only of this very distinct species by sweeping at the edge of a small wood near Killarney, on June 6th, 1927.

The following abridged description by Ganglbauer (Kaf. Mitteleuropa, iii, p. 997) may help to identify the insect, should it be met with again in our islands.

'Hemispherical-ovate, brownish-yellow or light brownish-red; the head, an indistinct design on the thorax, and five large pear-shaped spots on each elytron, whitish-yellow or whitish. Head and thorax finer and less closely, elytra more strongly and closely punctured . . . Of the pale spots on the elytra, the 1st is behind and outside the humeral callosity; the 2nd at the base near the suture, and the 3rd, which is further from the lateral edge than the 1st, with the 4th situated near the suture in a transverse row close to the middle, the 5th being before the apex. Long. 5–6·5 mm. Central and Southern Europe, Siberia. Scarce.'

Hydrothassa marginella L., var. *devillei*, var. nov.

This undescribed variety is named in honour of Lieut.-Col. Deville as a slight acknowledgment for his painstaking assistance.

The usual yellow margins of thorax and elytra are in this form entirely absent. The sides of thorax and elytra are brassy-black; the head, disc of thorax and elytra are greenish, or sometimes bluish, bronze.

Locality.—By general sweeping near the shores of the Lower Lake, Killarney.

Cassida sanguinosa Suffr.

This interesting addition to the British list, Lieut.-Col. Deville informs me, is not rare on the Continent. He takes it by sweeping *Achillea Ptarmica* in damp meadows.

I was fortunate enough last summer to capture a nice series on boggy ground, where this plant was very plentiful.

The following is a somewhat condensed translation of the Latin diagnosis of *C. sanguinosa* by J. Weise (Naturg. Ins. Deutschlands, i, p. 1102).*

Short oval, somewhat convex, upper surface green, suture of elytra with a short subtriangular sanguineous patch, underside black, sides of abdomen pale yellow, antennae testaceous, fuscous towards apex, thorax semicircular, closely punctured, angles subacute, elytra confusedly and deeply punctured at the base, from thence seriate-punctate, 2nd and 4th interstices slightly raised, legs testaceous. Length 6–7 mm.

In the 'Catalogus Coleopterorum Europae' of Heyden, Reitter and Weise, the species is indicated as occurring in Central Europe and Sweden.

High Street, Killarney.
March 9th, 1928.

* I am greatly indebted to my friend Dr. P. Hanitsch, F.E.S., for his kind assistance in translating the diagnoses of the *Coccinella* and the *Cassida*.—J.J.W.

A NEW NEPTICULA FROM NORTH WALES.

BY E. G. R. WATERS, M.A., F.E.S.

Nepticula spinosissimae, n. sp.

IMAGO. *Antennae* ½, shining fuscous. *Head* long-haired, black; *antennal eyecaps* white or pale ochreous; *collar* pale ochreous. *Thorax* shining pale bronzy. *Forewings* uniform shining pale bronzy, with grey and coppery reflections when viewed obliquely; *cilia* grey. *Expanse* 3–4 mm. *Hindwings* shining grey, slightly bronzy; *cilia* about 5, grey. *Underside* of both fore- and hindwings fuscous, rather shining; *cilia* grey. *Abdomen* shining dark grey. *Legs* shining pale bronzy above, whitish beneath. (Described from 10 specimens. The type, a male, has been deposited, together with a female, in the Hope Department of the Oxford University Museum.)

EGG a silvery globule, appearing black when the larva has filled it with frass; placed anywhere on a leaflet of *Rosa spinosissima* L., usually on the upper surface, seldom (6 instances out of 47 examined) on the under surface.

LARVA about 3 mm. long when full-grown; bright amber-yellow; mining leaflets of *Rosa spinosissima*. *Mine* a long gallery; very slender and inconspicuous at first, it widens gradually and ultimately attains a width of about 1·5 mm.; the gallery wanders at first in the vicinity of the egg, but on reaching the leaf-edge it follows the edge for some distance, often encircling the greater part of the leaflet; since the larva excavates each successive serration, the gallery along the leaf-edge forms a succession of small curves or undulations; on reaching or nearing the base of the leaf, or sometimes sooner, the gallery doubles back and forms another wide curve just inside the first, often encroaching on the first; the doubling process is repeated if necessary, the central portion of the leaf being touched only in the last resort; in small leaflets the mine assumes the appearance of a blotch occupying the whole area except the very base; in large leaflets the mine is occasionally confined to one side of the midrib; when the mine has started near the centre of the leaflet, the later portions cross and often obliterate the early portion; in the longest examples the total length of the gallery, if straightened out, would approach 40 mm. *Frass* black; at first entirely fills the gallery, but as the gallery widens it becomes a thick central line, occupying in the later portion from ¼ to ½ the width of the gallery, with an opaque greenish-yellow margin on either side; the thickness of the line varies considerably, probably owing to inequalities of the food supply; occasionally the frass is more scattered, the separate grains being discernible, but the tendency to form a central line is almost always visible. The gallery terminates in a small chamber, rectangular with rounded corners, about 3×1·5 mm., free from frass. The larva quits the leaf through a semicircular slit in the upper cuticle, on or near that edge of the chamber which is farthest from the exit of the gallery.

COCOON a somewhat flattened ovoid, unusually long, 2×1 mm. or a trifle larger, broader at the end from which the imago emerges; dark brown or blackish; placed in some groove or angle of a leaf (or of tissue paper, in captivity); the groove or angle is often artificially formed, or held in position, by means of some strands of pale silk stretched over the cocoon. *Pupa-case* (when empty) brown or dark fuscous, hardly transparent; projecting from the cocoon after the emergence of the imago.

The larvae which produced this interesting little moth were found on September 15th, 1927, on some coast sandhills at Llandudno (Caernarvon), where the pretty burnet-rose manages (with

some difficulty) to hold its own against golfers and holiday-makers. Being always anxious to ascertain the range of food-plants of the smaller Lepidoptera, I seized an opportunity of searching some of the rose-bushes for leaf-mining larvae, not expecting to find anything more than *N. anomalella* Gz. or *N. centifoliella* Z., or possibly the little-known *N. hodgkinsoni* Stt. The search resulted in the discovery of about thirty *Nepticula* mines containing larvae, besides many empty mines, all of one type. Unfortunately I omitted to make a detailed description of the larvae, but hope to make good this deficiency at some future date. Some of them died in the mines, but about two dozen completed their feeding and formed cocoons. These were brought indoors in the first half of December and put in a warm place. On December 29th a moth, not agreeing with any known species, was found to have emerged; at the same time another empty pupa-case was discovered, the moth from it having escaped by some mischance. Further examples appeared on January 21st, January 28th to February 2nd (one each day) and February 11th (two). Mr. E. Meyrick, to whom I submitted the first specimen, had no hesitation in pronouncing it to be an undescribed species.

Spinosissimae comes very close, in its imaginal stage, to *N. minusculella* H.-S., but may be separated from that species without difficulty by its brighter colour, due to the absence from the forewings of any purplish tinge. From *N. nylandriella* Tgstr., which it also resembles, it can be readily distinguished by its warmer colouring and black head. From all other British *Nepticulae* without pale markings, including the rose-feeders *N. anomalella* Gz. and *N. fletcheri* Tutt (which are perhaps a single species), it is distinguished by the entire absence of any purplish colouring or dark suffusion. The larva, being yellow, cannot be confused with the green larvae of *minusculella* and *nylandriella*. The mine is characteristic; an interesting feature, seen also in the mines of other *Nepticulae* which feed in small leaflets (such as *N. poterii* Stt. on *Poterium Sanguisorba*, or *N. serella* Stt. on *Potentilla Tormentilla*), is the extreme care with which the larva, as it circles within the leaflet, avoids biting through the lower part of the midrib and interrupting its own food-supply. It is probable that a careful search would reveal the presence of this insect in other localities where *Rosa spinosissima* flourishes. The readiness with which it responds to warmth indicates that in nature it is double- or continuous-brooded.

184 Woodstock Road, Oxford.

March 22nd, 1928.

BOMBUS AND *VOLUCELLA* IN THE HIMALAYAS.

BY O. W. RICHARDS, M.A., F.E.S.

Mr. H. G. Champion, on his trip in N. Kumaon, India, in 1924, caught a *Volucella*, superficially very like our common *Bombus*-commensal, *V. bombylans* L. The fly was taken in company with the workers of a humble-bee much resembling it in colour. Prof. Dr. P. Sack, to whom I sent the *Volucella*, finds that it is a new species, and in an appendix to this note I give a translation of the description he was kind enough to draw up for me. The *Bombus* was also a new colour-variety of the common Indian hill species, *B. rufofasciatus* Smith. This bee is allied to *B. lapidarius* L., the males having quite distinct genitalia of the same general plan.

B. rufofasciatus Smith, var. *championi* n. var.

The colour pattern of this new variety is as follows:—The hairs are black; a fairly broad collar to a little below the anterior thoracic spiracle, where the collar becomes broader, scutellum in part, postscutellum, and the first abdominal tergite, snow white; second tergite bright yellow, except for the apical third and for a small discal patch; a narrow band at the base of the third tergite black, the remainder of it vermilion; the fourth and fifth tergites white; the short hairs of the sixth, black. Hairs rather long and uneven.

In the typical form the second tergite is entirely black. The type specimen of the variety is a female in the collection of the British Museum and has the label 'Kashmir, 8-9000 ft., June 1901, Lt.-Col. C. G. Nurse.' Other specimens in the collection of the Brit. Mus. are the following: 1 worker, Gulmarg, Kashmir, summer 1913, Lt.-Col. F. W. Thomson; 15 workers and 1 male, Gyantse, Tibet, 13000 ft., June 1904, H. J. Walton, Tibet Expedition; 2 workers, Khamba Jong, Sikkim, 15-16000 ft., 15-30 June 1903, Tibet Expedition; 7 workers, Phari, Tibet, 16000 ft., 21 July 1924, Major R. W. G. Hingston; 1 worker, Gautsa, Tibet, 11500 ft., 21 July 1924, Major Hingston; 1 worker, Shekkar, Tibet, 14000 ft., 9 July 1924, Major Hingston (whose specimens were all captured on the second Mt. Everest expedition). Further, 1 worker, Sangcha, N. Kumaon, India, 14000 ft., H. G. Champion, in my collection. The male specimen differs from the female in having the hairs of the clypeus and vertex white, of the fourth tergite red, of the fifth to the seventh white, much black mixed on the sixth and seventh.

APPENDIX, BY PROF. DR. P. SACK.

Volucella flavoscutellata Sack, n. sp.

The species strongly resembles the red-haired form of *Volucella bombylans* L., but is sharply separated by having a row long black bristles on the hindmargin of the entirely pale yellow scutellum and in having the face entirely black, with short white hairs.

Female. Vertex black-brown, with three clear furrows, about half as broad as an eye, with long outstanding yellowish faun-coloured hairs. Antennae black-brown; the third joint in structure like that of *V. bombylans*, plumed with long black bristles. Eyes with long, thick black hairs. Face shaped like that of the Linnaean species, black-brown with rather short white hairs, scarcely hiding the ground colour. Dorsum of the thorax and the pleurae shining black, with outstanding black hairs, mixed on the disc of the thorax with shorter blackish faun-coloured hairs, the latter predominating just before the scutellum. On the brown posterior thoracic callae the hairs are bristle-like. Scutellum light yellow, dull, with moderately long and dense yellowish fawn-coloured hairs. Legs black, with black-brown knees and with very long black hairs on the coxae, the trochanters and the underside of the femora. Wings somewhat brownish tinged, with a black-brown costa and a brown central cloud, forming a band half traversing the wings at the cross veins. The veins are entirely black-brown. The squamae are brown, clouded with black-brown; the halteres also brown. Abdomen brown, somewhat shining; at the base and apex with yellow-white, in the middle with fox-red, hairs. The shining black venter is black-haired basally, red-haired on the apical half. Length 13 mm.

One female, Sangcha, N. Kumaon, Himalaya (H. G. Champion). The type is in the collection of the British Museum.

70A Belsize Gardens, London, N.W.3.

April 11th, 1928.

OCCURRENCE OF THE BAT-BUG, *LOXASPIS MIRANDUS*, IN PORTUGUESE EAST AFRICA, AND NOTE ON THE ASSOCIATION OF SOME COLEOPTERA WITH BATS.

BY HUGH SCOTT, M.A., SC.D.

The remarkable Cimicid genus *Loxaspis* was erected by the late Hon. N. C. Rothschild in 1912 (Bull. Ent. Res. II, part 4, p. 363) to include a single species, *L. mirandus*. In this insect all the tibiae have a pseudo-joint. The presence of pseudo-joints in the legs (either in femora or tibiae or both) is a character shared by the Hemipterous bat-parasites of the family Polyctenidae and the Dipterous bat-parasites of the family Nycteribiidae. But, at the time when *Loxaspis* was described, no other Cimicid exhibiting this feature was known, since not even the species of *Cimex* which parasitise bats have pseudo-joints. Later in the same year (1912), however, another Cimicid with pseudo-joints in the middle and hind (though not in the front) tibiae was described, namely *Aphrania barys* Rothschild and Jordan (Novit. Zool. xix, p. 353) from Basutoland. The host of this bug was not stated.

Loxaspis mirandus was originally found at Kilindini, near Mombasa, in a house the roof of which contained many bats of a species determined as probably *Taphozous hildegardeae*. The bug does not appear to have since been recorded from any other place or host, but Mr. Hugh B. Cott recently handed me some examples

from the Fambani River, a small stream in Portuguese East Africa just south of the mouth of the Zambesi. They were taken in the hollow trunk of a *Borassus*-palm, which contained many dead examples of a Free-tailed Bat, *Mops angolensis* Peters. The bat has been identified by Mr. Oldfield Thomas and the *Loxaspis* has been compared with the original type by Mr. W. E. China.

The exact locality was about fifteen miles south-west of a small station called Marromen. The palm-tree, quite rotten inside, had apparently been blown down. Within it were some fifty or sixty dead bats, while living examples were seen scrambling up a large termite-hill and searching for shelter in a helpless fashion. From inside the tree, among the carcases, Mr. Cott collected three species of beetles, identified by Mr. K. G. Blair as follows: *Trox squalidus* Ol. (adults and larvae); *Tenebrio* sp., probably *clypealis* Geb. (adults and larvae); *Alphitobius diaperinus* Pz. (adults only). Great quantities of mites were also found. Mr. Blair has remarked that the beetles were all likely to have been feeding in accumulations of bats' dung. This, together with the presence of well-grown larvae, is in accordance with Mr. Cott's supposition that the bats had been killed by the fall of the tree and that the tragedy was recent enough for survivors to be seeking refuge near at hand. Evidently the beetles and their larvae were already in the tree before its fall.

I am much indebted to Mr. Cott for putting at my disposal particulars of this curious association of bats, bugs and beetles.

University Museum of Zoology, Cambridge.

March 26th, 1928.

NOTES ON THE CAPSID BUGS FOUND ON SPECIES OF *RIBES*.

BY F. R. PETHERBRIDGE, M.A., SCHOOL OF AGRICULTURE, CAMBRIDGE; AND W. H. THORPE, B.A., ZOOLOGICAL LABORATORY, CAMBRIDGE.

During 1926 and 1927 we made a survey of the damage caused to currants and gooseberries in the Eastern Counties by the various species of Capsid bugs.

The bulk of the damage was found to be caused by *Lygus pabulinus*, and a detailed account of this pest is to be published shortly in the 'Annals of Applied Biology.' In some plantations the chief culprit was *Plesiocoris rugicollis*.

During this survey we made notes on other Capsid bugs found on these hosts, and these are reproduced below.

LIST OF CAPSIDS OBSERVED BY US ON *RIBES* SPP.

Aetorhinus angulatus Fall.
Calocoris bipunctatus Fab. (*C. norvegicus* Reut.).
Capsus ruber Linn.
Liocoris tripustulatus Fab.
Lygus contaminatus Fall.
L. kalmii Fab.
L. pabulinus Linn.
L. pratensis Fall.
Malacocoris chlorizans Fieb.
Orthotylus marginalis Reut.
Phytocoris tiliae Fab.
Phytocoris ulmi Linn.
Plagiognathus arbustorum Fab.
Plesiocoris rugicollis Fall.
Psallus ambiguus Fall.

The following species have also been recorded on Currants (see Butler)[1] :—
Calocoris fulvomaculatus De Geer.
Elasmostethus ferrugatus Fab.
Pentatoma rufipes Linn.
Phytocoris varipes Boh. (probably carnivorous).
Pilophorus clavatus Linn.
Pycnopterna striata Linn.

On Gooseberry :—
Syromastes marginatus L. (Coreidae).

Aetorhinus angulatus Fall. (*Blepharidopterus* Oshanin, Cat.)

This exceedingly common insect was first observed plentifully on currants mainly at 4th and 5th stage larvae in the third week in July both at Cambridge and Histon. The larva, described by Reuter, is very easily recognised in all stages by the narrow, elongated pale green body, the conspicuous bright orange dorsal abdominal gland, and the black base to the tibia giving the appearance of a black 'knee.'

Sleeving experiments showed that no damage was done. Adults were present throughout August and part of September.

Calocoris bipunctatus Fab.

This bug was exceedingly common on nettles (*Urtica dioica*) at Wisbech, Bluntisham and Cambridge, and it was also observed in great abundance on asparagus which had been allowed to run to seed. 4th and 5th Instars were occasionally observed, and adults were frequently found on currants. The species does not appear to have been recorded previously from the two latter plants, and the Saxifragaceae constitutes a new order for the insect (*cf.* Butler, p. 397 [1]).

A description of the larva is given by Butler. It is easily distinguishable from other Capsids of economic importance by the black hairs covering the whole body, the pale line down the middle of the thorax and abdomen, the long antennae, and the stout black hairs on the legs. The first adult noticed emerged on June 27th.

Although this is the first record for currants, yet our experiments show that it can easily be reared on this plant.

Capsus ruber Linn.

The larvae of this bug were frequently taken from currants from the third instar onwards. Their red colour, together with the conspicuous black abdominal spines, make them easily recognisable in all stages.

There is no doubt that this species is both carnivorous and phytophagous. It was easily reared on a clean currant shoot where there was no animal food to sustain it. Late stages, however, when in cages sucked potato much more readily, feeding apparently indiscriminately on the stem and on both sides of the leaf. On 4th August three adults were given four *Lygus pabulinus* larvae 2nd—4th. One *Lygus* was very quickly sucked, and the adult *Capsus* continued to suck it for some minutes. The *Lygus* attacked was a somewhat weakly specimen, and no attempt was made to devour the others.

Liocoris tripustulatus.

One record only from currants.

Lygus contaminatus Fall. (Subg.).

This bug was recorded once only from currants. A 5th stage bug found in the Cambridge district on 30th June reached the adult stage in a sleeve on black currant. No spotting was noticeable on the shoot. This specimen had probably come from *Ulmus*, and appears to be the first record for currants.

The larva very closely resembles that of *Lygus pabulinus*, but differs from it in that the hairs on the tibiae spring from brown spots.

Antennal measurements agree so closely as to be of little value, but the tibia of the hind leg is markedly longer; *e.g.* 2.4 mm. in *contaminatus* and 1.65 mm. in *pabulinus*.

The larva is able to attach itself very effectively by extruding the hinder part of the alimentary canal in the same way as *P. rugicollis*.

Lygus kalmii Linn.

Third and fifth Instars and adults were found fairly freely on currants in September and early October.

Lygus pabulinus (Linn).

This was by far the most prevalent species found on both currants and gooseberries, to which it causes serious injury. A detailed account of this, together with its life-history, will shortly be published in the 'Annals of Applied Biology.'

Lygus pratensis Fall.

This species was found occasionally on currants.

Malacocoris chlorizans Fall.

Later stage larvae and adults were very common on currants at Histon during the latter part of July and throughout August. They were also present on a variety of other plants including apple, *Ranunculus repens* and *Urtica dioica*. None of these are mentioned as food plants by Butler. The majority of the larvae were matured during the early part of August, but there was great variation, a third-stage larva being found as late as the 18th. Several larvae were sleeved on a clean currant shoot on 28th July, but after six days no sign of any injury could be detected.

A description of the larva is given by Butler.[1]

Orthotylus marginalis.

This species was found sparsely on currants as adult only. Butler records it from black currants and refers to it as a serious pest in apple orchards. Previous work (Petherbridge and Husain[2]) has shown that this is not so and there is no evidence that its effect on currant is any greater than that on apple.

Phytocoris tiliae Fabr.

Occasional on currant as larvae from the second stage onwards. Its occurrence possibly only accidental, but nevertheless easily reared in sleeves on this plant, no marking being caused.

Plagiognathus arbustorum Fabr.

Another exceedingly common bug, very plentiful on currant, and a great variety of herbaceous plants (*Lamium album, L. purpureum, Urtica dioica,* Potato, Raspberry, etc.) at Cambridge, Histon and Bluntisham. Less common at Wisbech and King's Lynn. A second-stage larva was observed on June 10th and adults began to appear about the middle of July living on through September. The larva (described by Butler) is very variable, as is the adult, but easily recognised in all stages by the black lines on the margins of all the femora. Here again sleeving experiments showed no trace of damage.

Plesiocoris rugicollis Fall.

About ten years ago this was the common species found damaging red and black currants (but not gooseberries) and was often found attacking these, even when neighbouring apple trees showed no sign of their presence. From our observations in the

eastern counties in 1926 and 1927 *Lygus pabulinus* is now by far the commonest species on currants, and in many gardens *P. rugicollis* was not found. Occasionally, however, the latter is the predominating species. We have not found this species on gooseberries.

Psallus ambiguus Fall.

Occasionally recorded.

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School of Agriculture, Cambridge.

February 10th, 1928.

FURTHER NOTES ON THE BRITISH SPECIES OF *PROTURA*.

BY H. WOMERSLEY, F.E.S.

In my original notes* I mentioned that I possessed solitary specimens from three separate localities, belonging to the genus *Acerentomon* Silv. At the time I refrained from describing them.

Although all three specimens are immature, being of the eleven-segmented instar, I now venture to describe them briefly as new species. In doing this I rely chiefly on the ratios of (1) head length over length of labrum, and (2) length of fore tarsus over length of fore claw. These ratios, respectively designated LR and TR, were shown in my 'Study of the Larval Forms of Certain Species of Protura'* to be constant throughout the different instars of any particular species, and may reasonably therefore be considered specific.

The new species are :—

Acerentomon metarhinus, sp. nov.

Length (overextended) 1300μ, when mature would approximately be 1730μ, chitinised only on labrum, fore tarsi and terminal abdominal segments.

Head 173μ long, labrum short, only produced to 27μ, giving LR=6·4; pseudocelli 7·5μ; front medial pair of dorsal cephalic setae 30μ, basal setae 20μ.

Thorax; front legs 260μ, tarsus 93μ, claw 31μ, giving TR=3·0, tarsal setae 50μ, empodium short.

Abdomen chitinised apically.

A single specimen from amongst tangled bracken roots under a stone in Cranham Woods, Glos., 13. 9. 26. This species, with its short labrum, comes nearest to *A. microrhinus* Berlese, which has LR=9.3 and TR=3.5.

* E.M.M., Vol. lxiii, 1927, pp. 140-154.

Acerentomon agrorum, sp. nov.

Length (extended) 1170μ, when mature probably about 1560μ, chitinised on labrum, tips of fore tarsi and from segment 4 of abdomen onwards.

Head 140μ long, labrum produced to 34μ, giving LR=4·1, pseudocelli 9μ wide, front medial pair of dorsal cephalic setae 34μ, basal setae 18μ, max. palpi, when extended, reaching much beyond the tip of labrum.

Thorax; apodemes present but details not observable; front legs 293μ, tarsus 86·5μ, claw 34·5μ, giving TR=2·6, tarsal setae relatively long, reaching 50μ, empodium short, middle legs 187μ, claw 18μ, hind legs 220μ.

Abdomen chitinised from segment 4, tergal apodemes present, spines on eighth tergal pectine of equal length.

A single specimen from under stone along with *Acerentulus confinis* Berlese, Brockley Combe, Somerset; October, 1926.

Acerentomon pinus, sp. nov.

Length (extended slightly) 1080μ, when mature probably reaching 1400μ, devoid of chitinisation.

Head 146μ long, labrum produced to 44·4μ, giving LR=3·3, pseudocelli proportionately rather large, 11μ, max. palpi just reaching tip of labrum, front medial pair of dorsal cephalic setae 54μ, basal setae 20μ.

Thorax normal in shape, apparently devoid of apodemes and chitinisation. setae rather fine but long, reaching 67μ, front legs 280μ, stouter than usual, tarsus 93μ, claw 35·5μ, giving TR=2·6, tarsal setae 60μ.

Abdomen unchitinised and devoid of apodemes, somewhat broad, as mounted is not clearly transparent but has a slight yellow uniform opalescence, setae much longer than in other species.

A solitary specimen only under the bark of an old pine stump, Brockenhurst, New Forest; 24. 5. 26. In life the insect had not at all the appearance of a Proturan and might easily have been taken for a specimen of *Onychiurus* (Collembola) owing to its white opaqueness.

These three new species brings the number of species of *Acerentomon* known to be British to eight. Using the characters LR and TR it will be seen that they fall into three groups as follows:—

TR=3·0.		TR=2·6.		TR=2·25.	
nemorale Wom.	LR=2·8.	*pinus*, sp. nov.	LR=3·3.	*oblongum* Wom.	LR=4·75.
bagnalli ,,	,, 4·3.	*doderoi* Silv.	,, 3·65.		
affine Bagn.	,, 4·95.	*agrorum*, sp. n.	,, 4·1.		
metarhinus, sp. n.	,, 6·4.				

A. microrhinus Berlese would belong to a fourth group with TR 3.5 and LR 9.3.

KEY TO THE BRITISH SPECIES OF PROTURA.

Family—*ACERENTOMIDAE* Berlese.

Sub-family—ACERENTOMINAE Wom.

Genus—*Acerentomon* Silv.

1. Teeth of pectine of eighth tergite of equal length ..... 2.
Teeth of pectine of eighth tergite large, robust and of graduated

size, reaching a maximum in the middle of 16μ. Large species 2000μ. TR=3·0. LR=2·8 ..... *A. nemorale* Wom.

2. Head of abnormal shape, being almost rectangular and long. Length 1200μ. TR=2·25. LR=4·75 ..... *A. oblongum* Wom.
Head of normal shape ..... 3.

3. TR=3·0 ..... 4.
TR=2·6 ..... 6.

4. LR=6·4. Length estimated at maturity approx. 1730μ ..... *A. metarhinus*, sp. nov.
LR less than 6·4 ..... 5.

5. LR=4·95. Length 1550–1600μ. A somewhat delicate species. ..... *A. affine* Bagnall.
LR 4·3. Length 1500μ. More robust ..... *A. bagnalli* Wom.

6. Apparently devoid of chitinisation. LR=3·3. Length estimated at maturity approx. 1400μ ..... *A. pinus* sp. nov.
Species normally chitinised ..... 7.

7. Large species, 1900μ. LR=3·65 ..... *A. doderoi* Silv.
Smaller species approx. 1550μ (estimated). LR=4·1 .... *A. agrorum*, sp. nov.

Genus—*Acerentulus* Berlese.

1. Head squarish with a short apical cone. Length (extended) 800μ. TR=3·0 ..... *A. tenuiceps* Ewing.
Head of normal shape ..... 2.

2. Length (extended) 1500μ. TR=3·75 ..... *A. confinis* Berl.
Length (extended) 850μ ..... *A. gracilis* Berl.*

Sub-family—MERENTOMINAE Wom.
Genus—*Parentomon* Wom.
Only one British species ..... *P. clevedonense* Wom.

Family—*EOSENTOMIDAE* Berlese.
Genus—*Eosentomon* Berlese.

1. Not more than four setae in each row on abdominal tergites ..... *E. transitorium* Berlese.*
More than four (six) setae in each row on abdominal tergites ..... *E. ribagai* Berlese.

Sunny Meads, West Town, Somerset.
January 17th, 1928.

Neuraphes planifrons Blatch in the New Forest.—When collecting during Easter 1926 in the New Forest with Messrs. E. C. Bedwell and P. Harwood, I took a small *Neuraphes* from a decayed beech log, which on examination fitted well with Blatch's description of *N. planifrons*. Mr. H. Willoughby Ellis and I have compared and agreed it with the type in the Blatch collection, and my thanks are due to him for this kind help in settling the determination of my example. The occurrence of *N. planifrons* in the New Forest is of considerable interest, as I believe the only records for it hitherto are from Sherwood Forest. Other species found in the log included *Philonthus splendidulus* Gr., *Agathidium seminulum* L., *Paromalus flavicornis* Hbst., *Plegaderus dissectus* Er., *Elater cinnabarinus* Esch., and *E. pomonae* Steph.—B. S. WILLIAMS, 15 Kingcroft Road, Harpenden: *April 13th*, 1928.

* I have not seen specimens of these species.

Early larvae of Gelechia instabilella Dgl.—Probably the commonest of the British *Gelechiae* which frequent salt-marshes is *instabilella,* whose larva mines the leaves of *Atriplex portulacoides.* March and April, or even May, are usually mentioned as the months when the larva may be found; but on several occasions, when visiting salt-marshes in the first half of April, I have noticed that most of the mines were already empty. On January 16th, 1928, during a brief visit to Shoreham-by-Sea (Sussex), I found larvae of *instabilella* plentiful on the banks of the Adur; they were feeding busily, and some were already well grown. A few were collected and brought home, and within three or four weeks several had pupated. Putting the pupae in a warm place, I succeeded in rearing two examples of the moth as early as March 20th, and another on the 22nd. Mr. E. R. Bankes was therefore undoubtedly right in surmising (*cf.* Ent. Mo. Mag., XXX, 1894, p. 81) that the larvae of *instabilella,* being attached to an evergreen plant, feed from autumn onwards through the winter.—E. G. R. WATERS, 184 Woodstock Road, Oxford: *March 22nd,* 1928.

Note on swarms of Typhlocybid Bugs on Phlomis and other plants.—Throughout the season of 1927, in more than one place in England, *Phlomis fruticosa* was infested by phenomenally large swarms of minute hopping bugs of the genus *Eupteryx.* The plant under discussion is a shrub of the Order Labiatae from the Mediterranean Region and, since it is easily propagated by means of cuttings or layers, it is grown in many gardens for the sake of its whorls of bright yellow flowers and its grey-green foliage.

In my garden at Cambridge I first noticed swarms of leaf-hoppers on the plants about the end of June. On July 8th some hundreds of specimens were collected with a few strokes of a sweeping-net. The insects were present in such extraordinary numbers that, whenever the plants were disturbed, the air was filled with a little cloud of leaping bugs. The foliage was completely disfigured, every leaf being closely mottled with whitish specks and blotches due to the sucking of the hoppers. The sample of the latter collected was submitted to Mr. W. E. China, who found it to consist of only two species, *Eupteryx abrotani* Douglas and *Eupteryx melissae* Curtis.

Two groups of *Phlomis* plants on opposite sides of the house were similarly affected. In one case several other plants growing close to the *Phlomis* were also infested. These were: Southernwood, *Artemisia Abrotanum* (Compositae, Mediterranean); Balm, *Melissa officinalis* (a cultivated Labiate); and *Calamintha Nepeta* (Labiatae, Britain). The leaves of the Southernwood turned brown, those of the other two plants had whitish blotches. On my second group of *Phlomis,* growing in a sheltered corner under the wall of the house, one species of the hoppers at least (*E. melissae*) was still abundant as late as Oct. 25th.

While my plants were so heavily attacked early in July, some *Phlomis* which I examined in the Cambridge Botanic Gardens, about a mile away, were almost entirely clean. They were in a more open situation than those in my garden. At Oxford, on July 17th, I noticed a few *Eupteryx* on a *Phlomis*-plant in Professor Poulton's garden, but could see no trace of infestation on plants in St. John's College Garden. Finally, on August 25th, Mr. E. E. Green kindly sent me some densely mottled leaves of *Phlomis* from his garden at Camberley, and told me that *Eupteryx* occurred there so abundantly as quite to disfigure the plant.

Some readers may have opportunity to observe whether the plague recurs in 1928.—HUGH SCOTT, University Museum of Zoology, Cambridge: *March 26th,* 1928.

Corixa dentipes Thoms. in the Killarney District of Co. Kerry, Ireland.—Having read the interesting article by Mr. W. E. China on the new British *Corixa* in the April number of this Magazine (*antea*, pp. 85–7), I am glad to detected two ♂♂ of *C. dentipes* Thoms. amongst them. Both these were captured in a small pond-like lake close to Lough Looscaunagh in the Upper Lake region of Killarney. This lake or pond is full of black peaty mud, and the surrounding land on three sides is of a boggy nature. *Corixa moesta* Fieb. and *Notonecta glauca* var. *furcata* Fab. are both common in this pond.

All my specimens of *C. geoffroyi* from the Killarney lowlands are quite typical; and *C. dentipes* will no doubt occur more commonly in the boggy uplands than in the lowlands. I believe that it will be found to be fairly plentiful in the above-mentioned lake is duly worked for.—EDWIN BULLOCK, Killarney: *April 10th*, 1928.

Corixa dentipes Thomson in Staffordshire.—With reference to Mr. China's note on the occurrence of the above insect in Lincolnshire, Mr. Britten has just found a single male specimen in my series of *C. geoffroyi*. This was taken on November 4th, 1927, in a small pond in a field close to my house in Madeley, Staffordshire. In my insect the intermediate legs are distinctly darker, the outside of the apical half of the femora, and the tibiae being tinged with fuscous. In all my specimens of *C. geoffroyi*, all taken in this neighbourhood, the intermediate femora and tibiae are of a uniform, rather pale, testaceous colour. The thickening of the intermediate femora and the darker colour give *C. dentipes* quite a distinct appearance even without a lens, and I cannot understand why I did not notice it earlier, or why more experienced Hemipterists than I am have missed it, if, as seems probable, they have it in their collections under *C. geoffroyi*.—H. W. DALTRY, Bar Hill, Madeley, Crewe: *April 16th*, 1928.

Obituary.

Edward Bonney Nevinson, F.Z.S., F.E.S., passed away after a long illness at his residence, Morland, Cobham, Surrey, on the 21st February last, in his seventieth year.

He was born on the 3rd October, 1858, at Leicester, the youngest son of Mr. George H. Nevinson, Registrar of the Court of Probate of that city, and of his wife Maria, of the ancient family of Woodd of Shinewood, Co. Salop. Educated at Shrewsbury School, he was by profession an architect.

Early in life he developed an enthusiasm for natural history, and, as years went on, he accumulated a vast store of knowledge in many of its branches. Working with his brother, the late Basil G. Nevinson, he made important collections illustrating British Ornithology (principally by nests and eggs), Conchology and Entomology; he also made a good collection of Crustacea. He became a Fellow of the Zoological Society in 1895.

But Entomology was his favourite study. At first he confined his attention to the Lepidoptera, of which his collection is a good one. Later he turned his attention to the Coleoptera, the Neuroptera and the Hymenoptera—particularly the Aculeata. He was attracted to the latter when on a visit to the writer in 1896, taking his first *Colletes cunicularia* at Wallasey. In 1901 he joined thte Entomological Society. In course of years he became intimate with the late Edward Saunders, F.R.S., and F. D. Morice and F. W. L. Sladen; more recently he corresponded regularly with Dr. Perkins, Mr. A. H. Hamm and Mr. O. W. Richards, affording to all six help in their several researches and publications.

Unlike most Hymenopterists, Nevinson always set his specimens; and this very beautifully. So much so, that when he showed his collection at the Entomological exhibition held at Burlington House in 1912, it was the subject of much comment and admiration. There is no doubt that set specimens of Aculeates show up the undefinable character and appearance of a species in a way that unset ones cannot do.

Nevinson was the discovered in Britain of *Halictus semipunctulatus* (E.M.M. 1904, p. 11) and the re-discoverer of *Heriades truncorum* (E.M.M. 1907, p. 277), of which he succeeded in establishing a flourishing colony in his garden. Other Aculeates upon whose distribution and habits he was able to throw new light, include *Gorytes laticinctus, Crabro saundersi, Pompilus approximatus* and *Osmia parietina.*

Unfortunately he did not write much beyond contributing brief notes of his captures to this journal. He possessed a fund of first-hand information acquired by years of careful observation, but with characteristic modesty and generosity, he almost invariably placed his knowledge at the disposal of his friends for publication.

He will be greatly missed by the many Entomological friends who were wont to enjoy happy hours in his delightful Surrey home in the society of one of the most generous-hearted and courteous of men. It was ever a joy to share with others his stores both of specimens and of knowledge.

Over thirty years ago, Nevinson purchased a strip of Wicken Fen for preservation. This he recently transferred to the National Trust.—WILLOUGHBY GARDNER.

Society.

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, March 7th,* 1928.—Mr. J. E. COLLIN, President, in the Chair.

The President announced the deaths of the following Fellows:—G. F. Mathew, E. B. Nevinson, J. A. Nix, R. E. McConnell, W. G. Dawson.

The following were elected Fellows of the Society:—Major G. Covell, I.M.S., M.D., Central Malaria Bureau, Kasauli, India; C. O. Hammond, 56 Boreham Road, Lordship Lane, Wood Green, N.; Mahmoud Hosny, Entomological Section, Ministry of Agriculture, Cairo, Egypt; Major J. A. Sinton, V.C., O.B.E., I.M.S., M.D., D.Sc., Director, Malaria Survey of India, Kasauli, India; William Steer, Downing College, Cambridge.

Mr. H. Donisthorpe exhibited and made remarks upon rare mites infesting ants and beetles, from Windsor Forest. Mr. R. Adkin exhibited bred series of *Hyponomeuta padellus, H. malinellus* and *H. cognatellus,* and discussed their relationship. Dr. J. G. Myers, a living example of *Rhyssa persuasoria* bred at the laboratory of the Imperial Bureau of Entomology at Farnham Royal in connection with investigations on the parasites of *Sirex.* Mr. G. Talbot, photographs of the pupae of *Pseudopontia paradoxa* received from Dr. Schouteden, Director of the Musée du Congo Belge at Tervueren. Major-General Sir H. Tytler, a new form of *Stichophthalma sparta* from the North Shan States. Professor E. B. Poulton, F.R.S., exhibited and discussed: (1) The proportion of the forms of *Papilio dardanus cenea* bred from wild larvae in the Durban district by G. F. Leigh; (2) A further note by Capt. C. R. S. Pitman on Pierine migration in Kenya Colony; (3) Capt. Pitman's observations on wagtails attacking butterflies in Kenya Colony; (4) Observations and experiments on distasteful insects in Tenerife; (5) Adaptations which discourage in-breeding in Lepidoptera and other insects; (6) Partial or complete predominance of one sex in families of Lice; (7) Notes on *Nemoria viridata,* by Dr. R. C. L. Perkins; (8) A remarkable Jassid larva discovered by C. M. Henry in Ceylon, with a

note on its terminal abdominal processes by W. E. China. Mr. W. H. T. Tams, on behalf of Mr. T. Bainbrigge Fletcher, exhibited a drawing of a curious defence devised by a Lepidopterous larva for the protection of the pupa. Mr. K. G. Blair exhibited a remarkable insect-like growth of vegetable origin collected by Dr. G. H. Carpenter in Uganda. Mr. G. J. Arrow showed lantern slides to illustrate his paper on 'Polymorphism in horned beetles.' Dr. H. Eltringham gave an account, illustrated with lantern slides, of the silk glands in *Hilara*.—S. A. Neave, *Hon. Sec.*

ODONATA COLLECTED BY MISS MARGARET E. FOUNTAINE IN WEST AFRICA, WITH DESCRIPTION OF A NEW SPECIES OF *ORTHETRUM*.

BY KENNETH J. MORTON, F.E.S.

To Miss Fountaine, who has already given me from time to time many valuable dragon-flies from many parts of the world, I am once more indebted for a collection made by her in West Africa during 1926 and the early part of 1927. There are over 170 specimens, and although no Aeschnidae or Gomphidae at all are included, the collection in other respects is fairly representative and contains several species that are little known and one species of *Orthetrum* that appears to be quite new and which is now described below.

The localities from which the specimens were obtained are as follows: In Nigeria—Lagos, Ibadan and Oshogbo (February to April); Cameroons—Victoria, Buea, Ekona and Meanja (May to August); Sierra Leone—Freetown and Moyamba (September to November); and French Guinea—Conakry, Kouroussa and Foré-cariah (December, 1926, to February, 1927).

As on other occasions, I have availed myself of the assistance of my friend, Dr. F. Ris, in connection with the identification or confirmation of doubtful species. It is a pleasure to acknowledge such invaluable aid always so freely given, and in the present instance I am also beholden to him for the loan of papers which I did not possess relating to the African fauna, including a particularly useful one by the late Dr. le Roi, 'Odonaten aus Äquatorical-Africa' from 'Ergebnisse des zweiten Deutschen Zentral-Afrika-Expedition 1910-1911 unter Führung Adolf Friedrichs Herzogs zu Mecklenburg,' Leipzig 1915.

A list of the species taken by Miss Fountaine follows:—

Umma longistigma Selys.—Meanja, 5.vii, 1 ♂ ad.

U. mesostigma Selys.—Ekona, 26.vi, 1 ♂ ad. Dr. le Roi (l.c. p. 325) under *U. mesostigma* refers to an allied form from Belgian Congo and So. Cameroons, in which the superior anal appendages resemble those of *mesostigma*, but the inferior are not dilated at the apex as in the latter species. I have a ♂ from Manyema,

Congo, which is apparently of the same form. Also Förster has discussed the genus and described under the name of *U. saphirina* a species from Entebbe, Victoria Nyanza, which must be closely related, if it is not the same (Zeitsch. für wiss. Insekten Biol., Neue Beit. z. systemat. Insektenkunde, Bd. 1, 1916, pp. 23-24).

Sapho ciliata Fabr.—Freetown, 17.18.ix, 1 ♂, 1 ♀, 2-11.xi., 2 ♂♂, 1 ♀; Moyamba, 5.x, 2 ♂♂. The males of this series show very well the gradual development of the wing colours from the hyaline condition to the shining black with metallic green reflections.

Sapho orichalcea McLach.—Ekona, 23.29.vi., 17.vii, 5 ♂♂; Meanja, 2-10.vii, 1 ♂, 2 ♀♀. This series also shows very well the development of the wing colours, although in none of the specimens has it attained the extreme adult condition. In the two females the white band is almost completely distal to the nodus. Le Roi, who was able to examine series of *orichalcea* and *gloriosa* from a good many different localities, says the position of the band varies and apparently it cannot be relied on for the separation of the two forms, of which he gives a useful review (l.c. pp. 326-8). Size very variable; hind wing 31-42 mm.

Phaon iridipennis Burm.—Meanja, 2.vii, 1 ♂ ad.

Libellago curta Selys.—Ekona, 23.vi, 17.vii, 2 ♂♂.

Libellago sp.—Meanja, 8.vii, 1 ♂.

Libellago sp.—Moyamba, 1.5.x, 1 ♂, 3 ♀♀.

The first-mentioned of these two species agrees pretty well with Sjöstedt's *neptunus* described from a single ♂ (juv.) and a ♀. The second, as regards the colours of the abdomen, agrees with *dispar*, but ♂ *dispar* is described as having the thorax entirely black, while the ♂ now before me has yellow markings as follows: dorsal carina, forked humeral marking and two lateral bands. Some of the species have been described from inadequate material, and too little attention has been given to the liability of some of the colour features to disappear with increasing age or from post-mortem change. A state of chaos exists in the genus.

Mesocnemis singularis Karsch.—Oshogbo, 19.iii, 4 ♂♂. As described for the types, the head, thorax and basal and apical segments of the abdomen are pruinose in these specimens.

Pseudagrion melanicterum Selys.—Freetown, 15.ix, 1 ♂.

Ps. glaucescens Selys.—Lagos, 11.ii, 2 ♂♂.

Ps. massaicum Sjöstedt.—Kouroussa, 21-27.xii, 3 ♂♂. These specimens have the colours on the head and dorsum of thorax much darkened, but Dr. Ris has no doubt about the identity of the species.

Ceriagrion glabrum Burm.—Kouroussa, 21.xii, 1 ♂.

Agriocnemis forcipata le Roi.—Kouroussa, 21.xii, 1 ♂. The specimen is pruinose and cannot be fully compared with the original description of the unique ♂ from Bahr el Ghazal. The forcipate superior appendages, with their row of little teeth, leave no room for doubt regarding the determination.

Neophya rutherfordi Selys.—Moyamba, 4.x, 1 ♂. One of the most interesting species in the collection. Described by Selys in 1881 from a single ♂ in McLachlan's collection, it seems to have remained otherwise unknown to Selys and Martin.

Macromia sp.?—Oshogbo, 28.iii, 1 ♀. In very teneral condition. A small species, length of abdomen 38, hind-wing 34 mm.

Tetrathemis camerunensis Sjöstedt.—Oshogbo, 4.iv, 1 ♂; Lagos, 16.ii, 1 ♀.

Hadrothemis camarensis Kirby.—Victoria, Cameroons, 21.viii, 1 ♂; Forécariah, 2.ii, 1 ♂.

Orthetrum angustiventre Rambur.—Freetown, 3-11.xi, 2 ♀♀.

Orthetrum austeni Kirby.—Conakry, 4.i.27, ♂ and ♀ (sub. juv.).

Orthetrum icteromelas Ris.—Forécariah, 18-27.xii, 2 ♂♂, 2 ♀♀.

Orthetrum chrysostigma Burm.—Forécariah, 3.xi, 1 ♀.

Orthetrum brachiale Palisot de Beauvois.—Ibadan, 9-10.iii, 3 ♂♂; Oshogbo, 18.iii, 1 ♀; Victoria, Cameroons, 6.v, 1 ♂.

Orthetrum africanum Selys.—Lagos, 22.ii, 2 ♀♀.

Orthetrum sagitta Ris.—Forécariah, 5.ii, 1 ♀; 26.i, 1 ♂ (sub. juv.).

Orthetrum microstigma Ris.—Freetown, 17.ix, 1 ♂; Moyamba, 2.x, 1 ♂; Forécariah, 28-29.i, 2 ♂♂, 1 ♀.

Orthetrum stemmale capense Calvert.—Meanja, 10.vii, 1 ♀.

Orthetrum mundulum, n. sp.

♂. *Head:* labium dull whitish; labrum yellowish, face and frons pale bluish grey, the flattened anterior spaces of frons slightly darker and ante- and post-clypeus with just a greenish tinge; a black band at base of frons produced triangularly in middle and running downwards along the eyes; vertex and occipital triangle shining black; back of head greenish with brownish spots.

Prothorax: dorsum of two anterior lobes black with a narrow dull greenish margin; posterior lobe dull green with pale hairs. Thorax dull green on dorsum with minute black raised points, lighter green on sides, marked with dark brown or black thus: a somewhat semicircular marking anteriorly enclosing two small pale triangular spots; diffused antehumeral lines not quite reaching the ante-alar sinus, the latter distinctly but narrowly outlined in black, the dorsal carina very finely black; humeral suture black, narrowly so above but becoming broader in its lower part and there continued backwards to become confluent with a somewhat diffused blackish half-band on the lower

part of mesepimeron; a diffused blackish line above the stigma; 2nd lateral suture with a narrow black line interrupted in the middle, the lower part joining the black of the sternum; a short and somewhat ill-defined line in the middle of the lower part of the metepimeron; sternum mostly blackish.

Legs: coxae pale; trochanters, anterior femora and basal part of other femora pale on their posterior side; legs otherwise black, the femora slightly pruinose.

Abdomen at base moderately swollen laterally and dorso-ventrally; segment 3 only slightly contracted, the remaining segments with nearly parallel sides. Segments 1 and 2 dull green, sutures and carinae black with diffuse spots on lower part of 2; sides of 3 dull green, dorsally dark; remainder of abdomen, including superior appendages, entirely black, pattern nearly quite obliterated but probably consisting of elongate pale spots on either side of dorsal carina of segments 4 to 7; three terminal segments entirely black, the 10th shining; underside of 4–10 black, sutures of 4–8 and inferior appendage olivaceous.

Wings hyaline, scarcely tinged; a trace of pale yellow at base of forewings; a more extensive diffused yellow spot in hindwings reaching half-way to cubito-anal cross vein and covering also the two cells adjoining distal to the membranule which is grey. Pterostigma relatively broad, yellow between strong black nervures. Costa yellow, its antenodal portion with narrow black line posteriorly; nervures in sub-costal space yellow and partially so in the other spaces proximal to nodus as far as M_4 and including the cubito-anal cross veins. Arculus distal to 2nd antenodal. Venation rather open. A single row of cells in Rs–Rspl.; three rows of discoidal cells in forewing; in hindwing two single cells, then two double followed by three cells and increasing. Cu i in forewing from base of triangle; in hindwing slightly distal to lower angle. Nodal index $\frac{9-11}{10-10} \mid \frac{12-9}{9-10}$

Genitalia of 2nd abdominal segment, fig. 1, as seen from side; fig. 2, hamalus and part of anterior lamina from beneath very slightly oblique. In this specimen the inner parts (not shown) are exserted and the hamules in consequence thrown out of the normal position.

Length of abdomen (cum apps.) 21½, hindwing 23, pterostigma c. 2½ mm.

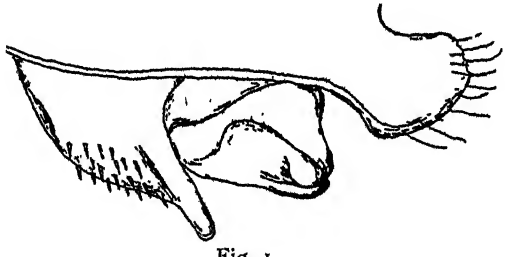


Fig. 1.

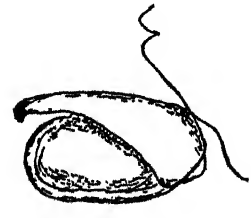


Fig. 2.

1 ♂, French Guinea, Kouroussa, 17th December, 1926.

Unless the type is an exceptional individual, the species is amongst the smallest, if not the very smallest, of the genus. Perhaps it may be placed, at least provisionally, in the little group of West African species comprising *sagitta* and *microstigma*, from which, however, it differs in having pale cross veins in the sub-costal space and its hamules also differ from those of all the other species.

Palpopleura lucia Drury.—Lagos, 11.ii, 1 ♂; Meanja, 8.vii, 1 ♂; Moyamba, 2-5.x, 3 ♂♂, 2 ♀♀; Forécariah, 27-28.i, 2 ♂♂, 31.i, 1 ♀: *portia* form or species, Ibadan, 9-10.iii, 2 ♂♂, 1 ♀; Freetown, 17.ix, 1 ♂, 1 ♀; Moyamba, 4-7.x, 6 ♂♂, 3 ♀♀; Kouroussa, 20-23.xii, 2 ♂♂, Forécariah, 28.i to 2.ii, 5 ♀♀.

Aethiothemis palustris Martin.—Kouroussa, 24.xii, 1 ♂ ad.

Chalcostephia coronata flavifrons Kirby.—Lagos 11.ii, 1 ♂.

Thermochoria equivocata picta Sjöstedt.—Meanja, 2.vii, 1 ♀.

Acisoma panorpoides ascalaphoides Rambur.—Kouroussa, 21.xii, 1 ♀.

Diplacodes lefebvrei Rambur.—Moyamba, 5.x, 1 ♂.

Crocothemis sanguinolenta Burm.—Freetown, 17.ix, 1 ♀; Moyamba, 5-7.x, 1 ♂, 2 ♀♀.

Crocothemis erythraea Brullé.—Kouroussa, 23-24.xii, 2 ♀♀.

Brachythemis leucosticta Burm.—Ibadan, 9-10.iii, 3 ♀♀.

Trithemis arteriosa Burm.—Oshogbo, 15.iii-5.iv, 2 ♂♂; Conakry, 2.xii, 1 ♀; Kouroussa, 16-27.xii, 18 ♂♂, 3 ♀♀.

Trithemis nuptialis Karsch.—Lagos, 11.ii, 1 ♂; Moyamba, 2.x, 1 ♂; Forécariah, 24.xii, 2 ♂♂.

Trithemis dichroa Karsch.—Kouroussa 16-21.xii, 2 ♂♂; Forécariah, 1.ii, 1 ♀.

Trithemis donaldsoni basitincta Ris.—Oshogbo, 19.iii, 1 ♂.

Olpogastra lugubris Karsch.—Buea, 15.vi, 1 ♀.

Pantala flavescens Fabr.—Lagos, 11.ii, 3 ♂♂.

Rhyothemis notata Fabr.—Moyamba, 1.x, 2 ♂♂, 4 ♀♀.

13 Blackford Road, Edinburgh.

March 9th, 1928.

MIARUS DEGORSI Ar., A COLEOPTERON NEW TO THE BRITISH LIST.

BY B. S. WILLIAMS.

Among a series of *Miarus graminis* Gyll. taken from the flowers of *Campanula glomerata* L. at Sharpenhoe, Beds., on July 8th, 1924, were three specimens which did not agree with any of the British members of this genus. These specimens were put aside for study, but unfortunately were overlooked till recently. From the table given by Col. Deville in his useful book 'Faune des Coléoptères du Bassin de la Seine: Supplement aux Rhyncophora' (Tome VI bis) p. 65, these appeared to be *M. degorsi*. Col. Deville, with his usual kindness, has examined them and informs me that they are undoubtedly this species and that they agree with examples taken from the flowers of *C. glomerata* in the original locality discovered by his old friend, the late Mons. A. Degors, at Orival, Seine Inférieure.

The characters separating *M. degorsi* from *M. graminis* (which it most resembles) may be tabulated:—

M. degorsi.	*M. graminis.*
Size smaller—2·5 mm.	Size larger—2·5–4 mm.
Colour, blackish.	Colour, grey.
Pubescence shorter, less plentiful, somewhat recumbent, and silvery in colour.	Pubescence longer, closer, more raised and bristly, with a yellowish tinge.
Thorax less transverse.	Thorax more transverse.
Tooth of hind femora less strongly developed.	Tooth of hind femora more strongly developed.

The abdomen of the male is simple in both species.

Besides the three Bedfordshire specimens I have two taken at Box Hill by Mr. E. J. Bunnett.

15 Kingcroft Road, Harpenden.
May 15th, 1928.

A MIGRATION OF *LIBYTHEA CARINENTA CARINENTA* Cr.

BY C. L. COLLENETTE, F.E.S.

Some twenty miles to the south of the town of Corumbá, in Matto Grosso, Brazil, is a range of heavily wooded hills, and close to their base the farm of Urucum forms a convenient centre from which to work the slopes. The level ground between Urucum and Corumbá is covered with dry, thickly growing 'scrub,' in which few butterflies are seen, but as the farm is reached the vegetation becomes higher and greener, freshened by several small streams from the hills.

On November 16th, 1927, I left Corumbá by car for Urucum, for a stay of eight days. The earth road passed through several low-lying muddy patches, caused by rain which had fallen a few days previously, one of the first of the occasional storms which heralded the wet season. Commencing at about a mile before the farm was reached, these moist areas were covered with extraordinary numbers of *Libythea carinenta carinenta* Cr., together with a few specimens of other moisture-loving species. Many thousands of the *Libythea* were present, matching the mud very closely, and as the car struggled forward it seemed in places as if the entire road surface rose from the ground, becoming a thick cloud of fluttering insects. In the neighbourhood of the farm and in suitable places along the streams similar gatherings were to be found, but very few of the *Libythea* entered the forest on the hill slopes.

From the 16th to the 21st the weather was fine and settled, with a breeze from the northward and a shade temperature which

reached 101°. The large gatherings of *Libythea* continued during this period, remaining all day quietly settled on the mud.

On the 22nd the wind changed and blew rather strongly, with a considerable drop in temperature and showers of rain. During this day and on the 23rd the mud was practically deserted, the *Libythea* resting motionless on twigs and grass stalks.

On the 24th the morning dawned bright and clear, with a fairly strong gusty wind still from the new direction, the S.S.W. At about 7.30 a.m. I noticed that many *Libythea* were flying past, at a height of from two to ten feet from the ground. The direction of flight was somewhat erratic, varying between S. and S.S.E.—that is to say, against the wind but up to 45° to the left of its line. I estimated that some 150 to 200 *Libythea* could be seen on the wing at the same time in an area of one hundred yards square, together with occasional Pierids, probably *Catopsilia statira statira* Cr. and *C. eubule sennae* L. The *Libythea* made good progress against the wind, but tended to fly round obstacles rather than over them.

I then visited one of the large assemblages on the mud, but so many insects were in the air that I could not follow the movements of individuals. At a smaller gathering, where perhaps 800 or 1,000 *Libythea* were settled, I watched for several minutes. Insects flying past frequently paused and fluttered over the gathering, but I could not detect any instances of settling. On the other hand, two or three in a minute rose and joined the passing stream, taking the general direction at once, without hesitation. In the instances which I was able to watch closely, there seemed to be no preliminary fluttering or walking about before taking to wing, and those which rose did not chase or play with those already in flight. I also walked about a quarter of a mile to the west, across the line of flight, finding that it was proceeding in similar numbers over this front and for as far beyond as the insects could be seen.

The attention of Senhor Cesar Carcano, the owner of Urucum, was called to the flight, who remarked that it had occurred in previous years and was believed locally to be a sign of rain. This was correct in the present instance, as the wind was blowing from the rainy quarter.

The flight was still continuing in much the same numbers at 9.45 a.m. (2¼ hours), when I left to return to Corumbá, travelling in the direction from which the butterflies were coming. The insects quickly became fewer, and in about a mile I reached the drier vegetation, in which practically none were present, and where no migration was visible.

It is perhaps worthy of mention that the direction of flight

would take the insects over level ground for many miles, while to the left and right of this line were hills of 1,500 and 2,000 ft. which would have formed a serious obstacle.

I had not paid much attention to the *Libythea* prior to the migration and cannot say whether they had been bred locally. No empty pupa cases were noticed and but three or four instances of pairing. It is possible that a migrating swarm may have been held up by unfavourable weather, and that I merely witnessed a re-starting of the flight, but I am inclined to think that they were bred locally or had been attracted from the drier country in the neighbourhood. Before visiting Urucum I had been staying in the Porto Suarez district to the N. and N.W., just inside the Bolivian border, and had seen no movement there among the *Libythea*, which were rather common.

Gothic Lodge, Woodford Green, Essex.
April 2nd, 1928.

THE WATERCRESS STEM-MINER.

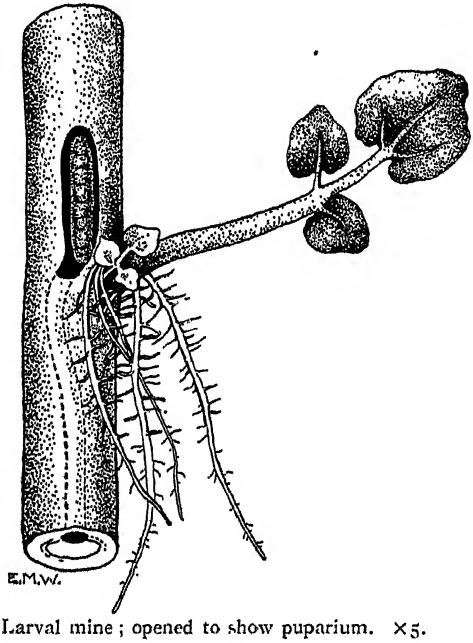
BY T. H. TAYLOR, M.A., F.E.S.

PLATE I.

In the watercress that comes to Leeds from the South during January and February many of the older stems are mined by a well-grown dipterous larva which, snugly ensconced in its burrow, is, unlike the Isopods and other small fry on the surface, indifferent both to the risks of transport and to the sorting and other processes of the market. The blemish that usually follows upon the wounding of a plant by an insect is here so slight as to be hardly noticeable, and although fifteen per cent. or more of the cress is sometimes mined there is no evidence to show that its value is thereby reduced or even that the presence of the larva is known.

The mine takes the form of a neatly-made tunnel running up the stem to the region of active growth, but never, as far as observed, injuring the actual growing-point or preventing the shoot from developing, the reason perhaps being that the mine is confined to the cortex and seldom, if ever, encroaches upon the sap-conducting tissue in the centre. Although the overlying epidermis is rarely broken, the tunnel underneath is generally easy to trace, at least in the older part, on account of its slightly discoloured appearance; and, moreover, blood-worms, which are enterprising enough to use a ready-made tube when they find one, often invade the tunnel and, being of a conspicuous colour, betray

its presence by crawling up and down inside. When the tunnel meets a leaf-base it generally turns to one side before going on, but sometimes it runs up a leaf-stalk and ends blindly as though the larva, realising its mistake, had turned round and gone back. Except for this irregularity the mines pursue a fairly straight course and are unbranched, each being plainly the work of a single larva which has entered at some point lower down. Generally there is only one track to a stem, but now and then two are present, and even five in one stem have been counted. The original entrance-hole is almost invariably absent, but sometimes a hole can be found high up in the shoot, and sometimes also a larva can be found with its head pointing downwards—exceptions which seem to show that occasionally a larva leaves its burrow and makes a new one either in the same or in another stem.



Larval mine; opened to show puparium. ×5.

The larva (see Plate I) is of the usual acephalous type with segmental locomotory hooks on the ventral surface of the body. The elongated tail region is beset with strong black-coloured chitinous nails, among which two of large size placed one on each side of the mid-dorsal line are especially prominent, looking in their symmetry like a pair of eyes. The body ends in a pair of backward-pointing processes, also dark in colour, which are connected in-

ternally with the long tracheal trunks and are no doubt respiratory in function; but in the pupa (puparium) they seem to serve also as fixative organs. Pupation (see fig. 1) takes place in the burrow, usually above a leaf-base or axillary bud, the pupa lying with its back facing outwards. In the laboratory, pupae have been obtained early in March and the flies in April, but nothing further is known of the life-history.

A notice of this or a closely-allied insect was published in 1903 by Dr. P. Marchal (Bull. Ent. Soc. France, July 1903), who found that it was injuring cress cultivation at Méréville (Seine-et-Oise). The fly he reared was identified by Dr. J. Villeneuve as *Hydrellia ranunculi* Hal. The present writer, before learning of Dr. Marchal's paper, reared the fly in 1924 at Leeds, and submitted it to Major E. E. Austen, who gave it as a species allied to *H. ranunculi*. Marchal points out that Haliday, in giving the name *ranunculi*, does not say anything about the nature of the larval food.

The writer is indebted to Mr. P. Grimshaw for the reference to Marchal's paper.

University of Leeds.
March 16th, 1928.

A NEW SPECIES OF *HYDRELLIA* (DIPTERA, EPHYDRIDAE) MINING THE STEMS OF WATER-CRESS.

BY J. E. COLLIN, F.E.S.

Mr. T. H. Taylor, of the Leeds University, has recently sent me numerous specimens of a *Hydrellia* bred from larvae found mining in the stems of Water-cress (*Nasturtium officinale* L.) obviously identical with the species recorded by Marchal (Bull. Soc. Ent. Fr., 1903, p. 236) as *H. ranunculi*, but which is certainly neither *ranunculi* Hal.* nor *incana* Stenh. (*ranunculi* Auct. *nec.* Hal.), and which I propose to call

Hydrellia nasturtii sp. nov. ♂ ♀.

A species with yellow palpi, black antennae and a somewhat shining disc to thorax.

♂. *Head* of usual shape. Frons dull brownish-grey with black reflections, the triangular frontalia on each side of trapezoid 'ocellar triangle' dull black from most points of view, ocellar triangle and occiput dull brownish-grey, but the front part of former may appear dull blackish and in some lights the same may apply to a lateral half of the triangle. Face silvery* or dull yellowish, in

* See my note on Haliday's type in the National Museum, Dublin (Scientific Proc. Roy. Dublin Soc., 1914, p. 251).

† Though the colour of the face has been extensively used as a specific character in the genus it has very little value, there are many species which like *nasturtii* may have the face silvery or yellow, the very common *incana* Stenh. (*ranunculi* Auct. *nec* Hal.) is one of them, and as a consequence it is almost certain that *modesta* Lw. will have to sink as a synonym of *incana* Stenh.

the latter case the lunulæ above antennae remaining silvery. Jowls below eyes about as deep as third antennal joint is long. Antennae dull black (greyish in some lights), arista with 5–7 long hairs on upper side.

Thorax so little dusted on greater part of disc as to remain shining black with a faint bluish or bluish-green tinge, humeri dusted greyish, sides of disc dusted brownish-grey, also the front part and a faint median stripe for a little way down the rows of acrostichal bristles, but a less dusted stripe extends on each side of this median stripe right to front of thorax. A distinct presutural dorsocentral bristle, though this is not so strong as the only other dorsocentral just behind suture. Pleurae dull grey. Scutellum and upper surface of abdomen more aeneous, the latter owing to a coating of greenish-grey dust; viewed from the side the abdomen appears dull, but from behind somewhat shining. Sternites and sides of tergites, which are more ventral, dull grey like the pleurae, this colour extending slightly on to disc at hindmargins of segments. Last abdominal segment almost as long as the two previous ones together, broad and truncate at tip. Genital ventral plate somewhat similar in shape to that of *incana*, but quite recognizably distinct.

Legs black, densely dusted greyish except for very narrow knee joints, extreme tip of all tibiae and first four joints of all tarsi which are yellowish. Hind femora and tibiae, as usual, shining behind (the side next to abdomen).

Wings rather short and broad, the length from humeral cross-vein to tip, measured in a straight line, compared with greatest width as 80 : 35. The distance from end of subcostal to end of radial vein compared with next costal segment, measured in a straight line, as 40 : 26. Outer cross-vein a little sloping, the lower outer angle of discal cell rather more acute than the upper. Halteres yellow with pale primrose yellow knobs.

♀. Resembling male, but abdomen not so truncate behind. Fifth tergite variable but usually longer than fourth. Eighth with an almost semi-circular excision on hind-margin.

Length about 2·5 mm. ♂; nearly 2·75 mm. ♀.

H. nasturtii is related to *incana* Stenh., but differs not only in the colour of thorax (entirely dull brown in *incana*) but also in having some posteroventral hairs on middle femora; in *incana* and *griseola* these femora are quite bare posteroventrally except at extreme base and just before tip, a condition only present among the British species in these two species and *laticeps* Stenh. (a synonym of *flaviceps* Mg. according to Becker). Becker has recently (1926) described a *H. pubescens* from Greece which must closely resemble *nasturtii*, but has the frons 'dark red-brown' and the ocellar triangle 'shining black.'

Rayland, Newmarket.
May 5th, 1928.

Lesteva fontinalis Kies. in Staffordshire.—It is interesting to record the occurrence of this essentially southern beetle in Sherbrook Valley on Cannock Chase, in company with *L. pubescens* Mann. and *L. heeri* Fauv. I was also surprised to find *Acrulia inflata* Gyll. at Lord Hatherton's place in the same area. All the above-named species are additions to the Victoria History List for the County of Staffordshire.—C. E. Stott, Armitage, Staffs.: *April 28th*, 1928.

FURTHER NOTES AND DESCRIPTIONS OF NEW BRITISH *THYSANOPTERA*.

BY RICHARD S. BAGNALL, F.R.S.E., F.E.S.

(*Continued from p.* 99.)

Platythrips tunicatus Hal.

Syn. ♂ *Bolacothrips nigricornis* Bagn.

Mr. G. D. Morison's interesting discovery of the previously unknown male of this species, which is so totally unlike the ♀, led me to re-examine my *Bolacothrips nigricornis*, which proves to be the ♂ *P. tunicatus* so ably described by Morison in these pages.

Thrips difficilis Pr.

1920 Sitzb. Akad. Wiss. Wein, cxxix, p. 75.

My manuscript name *salicicola* apparently refers to ♀ *viminalis* and ♂ *difficilis*! Though Priesner refers British examples to his *difficilis*, it is difficult to identify the ♀ with a cotype of *difficilis* ♀ in my possession.

With us the species appears to be coastal, and is found on the catkins and leaves of the dwarf sallow (*Salix repens*) together with its distinctive milk-white larvae.

LANCASHIRE, on the sand dunes between Blundell Sands and Ainsdale, vii. 1924; DURHAM, Hart, ix. 1924; and AYRSHIRE, near Ardrossan, ix. 1924.

Thrips angusticeps Uzel.

1895 Mon. Ord. Thys., p. 191, pl. VI, figs. 101, 102.

Forma macroptera ♀ ♀ only.

BERKSHIRE, Besselsleigh, on grass, vi. 1914; SURREY, Warlingham, in flowers of *Helianthemum Chamaecistus*, vi. 1925; and SUSSEX, Bognor, on *Sisymbrium*, vii. 1926.

Forma brachyptera (=*Achaetothrips loboptera* Karny teste Priesner and *Bagnallia asemus* Williams), ♀ ♀ only.

SURREY, Boxhill and near Headley, on grass and *Glechoma*, iv. 1927.

Thrips euphorbiae Knechtel.

1992-3 *Thrips euphorbiae* Knechtel. Bull. Sect. Scient. Ak. Ronm. VIII, 5-6, p. 75.

1923 (Mar. 1st) *Thrips crassicornis* Bagnall. Ent. Mo. Mag., 3rd Ser., IX, p. 59.

It is necessary to know the exact date of publication of Knechtel's paper before priority can be fixed. The species is now known from England, Hungary, Roumania and, somewhat doubtfully, from Poland, affecting various species of *Euphorbia*.

Thrips euphorbiicola Bagn.

1924 *Thrips euphorbiae* Bagnall. Ent. Mo. Mag., 3rd Ser., IX, p. 115.

I have recently recorded this species from the French Riviera from the flowers of *Euphorbia dendroides*, and have described a smaller allied species (*T. euphorbiella* Bagn.) from Hyères Plage, where it affects the flowers of the Sea Spurge, *Euphorbia Par* and may be expected to occur with us.

Thrips fulvipes Bagnall.

This species would appear to be locally common in the South (or at any rate the South-east) of England, but very rare North. I am able to give three Northern records, all of which are from *Mercurialis*:

PERTHSHIRE, Crieff, vi. 1927; HADDINGTONSHIRE, Tyninghame Woods, vii. 1927; and NORTHUMBERLAND, near Morpeth, vii. 1927. One ♀ in each case.

Thrips albipes Bagnall.

1914 Ann. Mag. Nat. Hist., Ser. 8, xiii, p. 25.

Described from Japan and since recorded from India, I have a single European example of this distinct species found on Durham coast. It agrees in every detail with the type.

The species has the fore part and legs of a golden yellow, the pterothorax and intermediate hind-trochanters shaded with brown and the abdomen of a deep uniform brown. The fore-wings are brown except in the basal three-eights or thereabouts, whilst the slender antenna are rich brown, as the abdomen, except joint 1 which is light greyish brown, 3 which is of a clear golden yellow, and the base of 4 narrowly pale. The setae are dark and those at the hind angles of pronotum moderately long (46-56), and there are three pairs of minor postero-marginals, of which the inmost is rather long. The upper vein of fore-wing is furnished with 3 setae in the distal half, whilst the hind vein is closely set with 14-19 strong setae (16 and 19 in the British example), conspicuous because of their stoutness and dark colour. The abdominal bristles are slender, 96-104 μ long on segment 9 and but slightly less on 10.

The species comes near *fulvipes* Bagn., and also near to the *discolor* of Continental authors, a species I do not yet know.

DURHAM, sea banks near Horden, 1 ♀ in flower of *Helianthemum Chamaecistus*, vii. 1919.

Thrips origani Pr.

1926 *Thrips origani* Priesner. Zool. Jahrb. 52, p. 272.

1927 *Thrips dyssochaetus* Bagnall. Ann. Mag. Nat. Hist., Ser. 9, XX, p. 570.

I have not seen Priesner's description, but comparison with a cotype he kindly sent me demonstrates the above synonymy. Priesner records the species from Austria and Hungary, whilst I have taken it in France, as well as in the South of England, where it is probably of wide distribution.

SURREY, Boxhill, Leith Hill, Woldingham, Purley and Coulsdon Common, in flowers of marjoram (*Origanum vulgare*), viii. and ix. 1924.

Thrips alni Uzel.

1895 Mon. Ord. Thys., p. 189.

Having searched for this species assiduously over a period of many years, and having taken it abroad on a non-British species of Alder, I gave up hope of being able to claim the species as British, and was therefore the more pleased when I casually found it in some numbers in a small alder fen in the middle of a Surrey wood.

SURREY, Squires Great Wood near Westcott, v. 1926, ♀♀ only, on *Alnus glutinosa*.

Thrips flavus Schr.

I have twice seen examples in which the style of one antenna was composed of two joints (including an example amongst a number of the species taken in Oxford on plum by Mr. A. H. Hamm, 20.v.1916), and on one occasion* an example in which both antennae had a two-jointed style, and which I record herein under the name *Physothrips flavus*, following a custom that was rendered necessary by a similar condition in a number of Eastern species, such as *Thrips* and *Physothrips albipes* Bagn. (Japan), *T.* and *P. flavidus* Bagn. (Japan), *T.* and *P. pallipes* Bagn. (India), and *T.* and *P. immsi* Bagn. (India). I think Coesfeld has previously noted this condition in *T. flavus*.

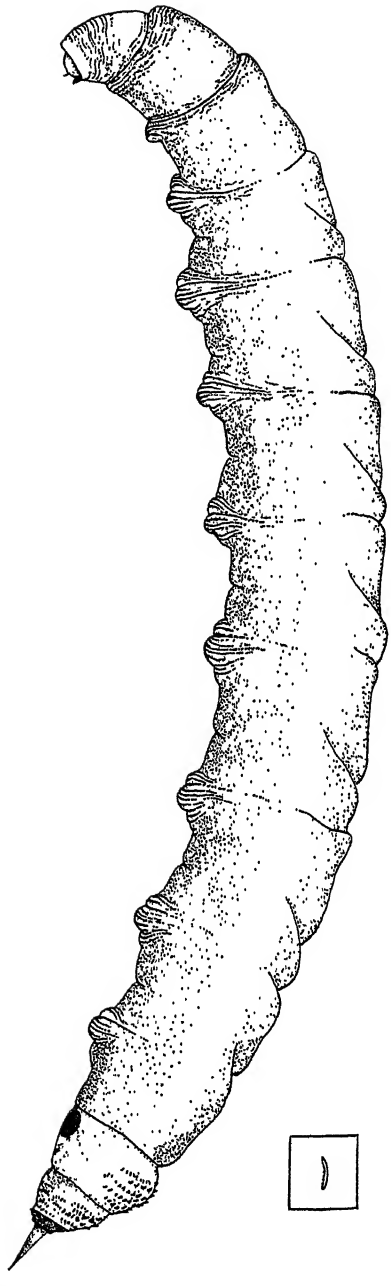
Thrips pillichi Priesner.

1924 Konowia, pt. 1/2, p. 2.

This species comes near to *tabaci* Lind., but the fore-wing has only three setae in the distal half of the upper vein, whilst the antennae are as in *T. praetermissus*, being yellow with end of 4 slightly, and of 5 more strongly, shaded grey, and 6 dark with the base light. The var. *fallaciosa* Pr. has the abdomen wholly blackish brown.

* A male with 2-jointed styles has been sent me since this was written, and the record is included under *P. flavus*.

(To be concluded.)



WATERCRESS STEM-MINING LARVA.

(*Drawn by Miss E. M. Wright.*)

SOME PSOCOPTERA FROM THE NEW HEBRIDES.

BY J. V. PEARMAN, F.E.S.

During his visit to the New Hebrides in 1927, under the Percy Sladen Trust, Dr. J. R. Baker (of the Department of Zoology and Comparative Anatomy at Oxford) managed to secure a few Psocids. Hitherto no representatives of the Psocoptera have been recorded from that locality, although several species have been described from Fiji and from the Bismarck Archipelago. There was a scarcity of Psocids in the area investigated, hence the material is slight. Nevertheless it contains some interesting forms, including two not previously described, and I desire to record my thanks to Dr. Baker for the opportunity of examining them.

The specimens obtained represent the following :—

1. *Liposcelis bakeri* n.sp.
2. *Nanopsocus oceanicus* n.g., n.sp.
3. *Caecilius* ———? sp. (nymph).
4. ——— ———? gen. et sp. (nymph).

1. *Liposcelis bakeri* n.sp. (Fig. 1, 2).

Colour (in alcohol) pale yellowish grey, with the following parts darker, brownish grey : clypeus, frons, thorax, six broad bands on the abdomen bordering the posterior margins of the third and fourth tergites, and the anterior margins of the sixth, seventh, eighth and ninth tergites, and the apex.

Of the usual Liposcelid facies. Eyes with eight ommatidia. Mouth parts as in *L. divinatorius* (Mull.). Hind femora with the sub-basal external projection bold but blunt. At each external lateral angle of the prothorax are *two* long bristles. Prothoracic sternite with four bristles; sternite of meso- metathorax with a row of nine bristles (fig. 2). The bristles at the lateral angles of the pronotum, and at the shoulders of the mesonotum, are rather stronger and much longer than in *L. divinatorius* (relatively $1\frac{1}{4} : 1$), but the anal bristles are shorter (relatively $2 : 2\frac{1}{2}$). The epidermal sculpture, both the shagreening and the reticulation, is rather coarser than in *L. divinatorius*.

Length 1·25 mm.

NEW HEBRIDES: Espiritu Santo, Hog Harbour, in camp, 9th March 1927. One ♀.

Type in Hope Collection, Oxford University Museum.

I have much pleasure in dedicating this striking species to its discoverer.

2. NANOPSOCUS n.g.

Type *N. oceanicus* n.sp.

Genus of the sub-fam. Pachytroctinae, fam. Liposcelidae.

Imagines totally apterous. Eyes set at extreme hind angles of head, slightly overreaching hind head margin. Ocelli nil. Antennae probably 15-segmented (defective), flagellar segments 6 and 7 broadly annulated. 'Pick' apparently bifid, actually tridentate. Mouth parts otherwise as in *Liposcelis*. Prothorax well developed, without notal divisions; mesonotum and metanotum distinctly

demarcated. Femora of first pair of legs enlarged; tibiae of all legs each with two apical spurs; claw with a pre-apical tooth. Abdomen oval, plump. Ciliation sparse; on body arranged in isolated rows.

I have felt some reluctance in proposing yet another genus in this small sub-family of insufficiently-known insects, but the present species presents points of divergence from each of the defined genera types. In the form of the pick and the position of the eyes it partakes the characters on which the genus *Psacadium* Endl. 1908 was separated from *Pachytroctes* Endl. 1905, but it differs from the types of both those genera, particularly in the distinctive body ciliation, agreeing in this respect, however, with the South African *Pachytroctes brunneus* Rib. 1911, which species may prove to be congeneric with that from the New Hebrides. Indeed it was the occurrence of two distinct species with a well-marked common peculiarity that suggested a generic significance for that characteristic. Only by a critical comparison of a longer series of forms than is at present known of these retrograde Psocids can the validity of all the genera be tested. Hence I have given a description as detailed as the material at my disposal permits. Meanwhile the genera may be distinguished thus :—

1. Eyes with groups of minute rods between the facets ... *Peritroctes* Rib. 1911.
   Eyes wholly bare ..... 2.
2. Eyes posteriorly not quite reaching hind head margin; Pick distinctly tridentate ..... *Pachytroctes* Endl. 1905.
   Eyes more or less overreaching hind head margin; Pick apparently bifid . 3.
3. Abdominal ciliation fine and generally distributed .... *Psacadium* Endl. 1908.
   Abdominal ciliation strong, arranged in isolated rows ..... *Nanopsocus* nov.

Nanopsocus oceanicus n.sp. (fig. 3-9).

♂. Colour (in alcohol) light yellow; clypeus, pronotum, and metanotum rather darker; palpi, basal joints of antennae, mesonotum, and legs paler. Anterior margins of abdominal tergites 4–8 narrowly bordered brown, except at the sides.

Head, including eyes, sub-triangular, lateral contour curved, hind margin weakly convex, vertex suture reduced to a very short median notch, frontal suture not visible. Upper surface with scattered fine hairs, of which a few near the antennal sockets and one at the posterior margin of each eye are noticeably longer. Eyes of many bold facets, large, hemispherical, slightly overhanging hind head margin. Ocelli nil. Antennae (fig. 6) defective (wanting from the seventh flagellar segment), basal segments of usual form; flagellar segments narrowly cylindrical, width of first two about a third that of the basal segments, remainder still narrower. The whole antenna beset with microscopically fine hairlets which are shortest on the basal segments and increase in length progressively on succeeding segments; the hairlets apparently arranged in whorls, but so closely placed that there is no distinct appearance of rings until the fifth flagellar and following segments, where the whorls are visibly separated; in addition the apex of the fifth, and the whole of the sixth and seventh (flagellar) segments exhibit broad, though faint, annulations. Besides the microscopic pubescence the two basal segments bear a few cilia, their length

rather less than the width of the segments, and the flagellar segments have a few long cilia near their apices and a row of three or four in their length; on the first three segments of the flagellum the serial cilia are setaceous and set on the upper side, on the remaining segments they are finer and transferred to the lower side. Towards the apex of each, the third and sixth flagellar segments have a short, stout spine, sharply bent forward near the seat of insertion. *Clypeus* small but prominent, with a few cilia. *Maxillary palpi* of four segments in the usual proportions, the distal segment long oval, its tip narrowly rounded; the whole with microscopic pubescence and a few longish cilia; no sensory spine visible on the second segment. *Pick* with the median tooth reduced and minute, the two lateral teeth long and slender, unequal. *Mandibles* and labium much as in *Liposcelis* (figs. 8, 9).

Prothorax transversely oblong, about as wide as head between eyes, and without visible divisions. Meso- and metathorax sub-equal, scarcely narrower than prothorax, apparently amalgamated, but the tergites distinctly defined. A few cilia occur on the thorax, distributed as in fig. 3.

Legs moderately long, slender; femora of first pair much, of others slightly enlarged; tibiae rather longer than femora; tarsi of three segments, together five-sixths the length of their respective tibiae; basal segment of tarsus of fore and mid legs about as long as the other two segments together, of hind legs twice as long (hind tarsal ratios $4\frac{1}{2} : 1 : 1\frac{1}{4}$); claw slender, weakly curved, with a pre-apical tooth. Tibiae and tarsi with microscopic pubescence (finer than on antennae); femora, tibiae and tarsi with a few fine bristly cilia; all tibiae with two apical spurs, one rather stronger than its fellow.

Abdomen with nine visible tergites; first segment narrower than, and partly concealed by, metathorax, somewhat fleshy, with a short seta each side; other segments of normal annular form; tergites 2–8 each with a single row of spaced setae inserted between the mid-line and the posterior margin, tergite 9 with a similar row anterior to the middle and a group of setae near the caudal margin. Hind margin of last tergite produced medially into two papillar processes, each furnished apically with a long bristle (fig. 4). Dorsal telson flap with two pairs of upstanding bristles on the disc, lateral telson flaps ciliated but without anal spines or sensory areas.

Epidermal sculpture of upperside of head a fine shagreen, of abdominal tergites a transverse irregular reticulation.

The copulatory apparatus has been extruded from the abdomen. As seen from above (fig. 5), a large, colourless, fleshy sac (presumably the swollen fused bases of the seminal vesicles) bears medially a simple rod-like penis, flanked, below, by a pair of short, curved, pointed, lamellar appendages. Beneath the sac, at either side, a long fusiform clasper, apically pointed and incurved, is articulated to a series of longitudinally disposed muscles.

Length of insect 1·04 mm.

Nymph (late instar) (fig. 7).

Colour pale yellowish with black eyes.

Antennae with the two first flagellar segments weakly curved, the long cilia disposed as in the imago, the sensory spines not distinguishable. Tarsi of two sub-equal segments. Meso- and metathorax each bearing a pair of tiny rudimentary wing pads. Last abdominal tergite simple. Otherwise as in imago.

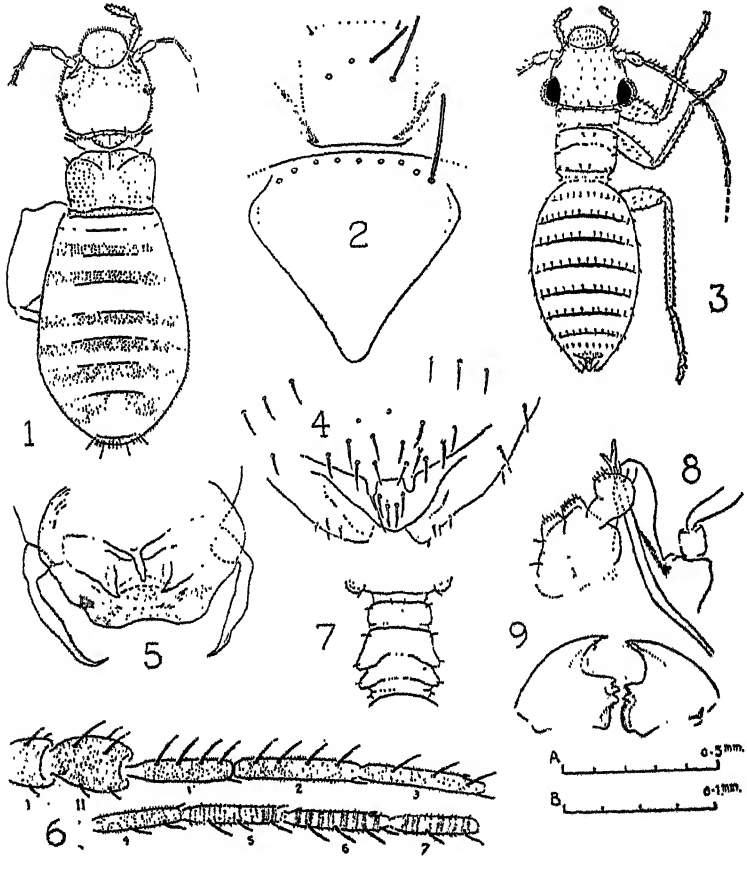
Length 0·95 mm.

♀. A female of this species was unfortunately lost in the course of preparation for mounting. It had large eyes produced hindwardly even more than in the male. No other structural details were noted. Length 1·3 mm.

New Hebrides: Espiritu Santo, Hog Harbour, in camp. 8th February 1927. One ♂, one ♀, four nymphs.

Type ♂ and nymph in Hope Collection, Oxford University Museum.

The processes of the last abdominal tergite of the male are probably peculiar to that sex, functioning as tactile sensory organs accessory to copulation. Antennal sensory spines were found by



Explanation of Figures.

Fig. 1. *Liposcelis bakeri*, ♀; 2. Same, thoracic sternites; 3. *Nanopsocus oceanicus* ♂; 4. Same, apex of abdomen, above; 5. Same, ♂ genitalia, dorsal aspect; 6. Same, antenna (nine segments); 7. Same, thorax of nymph; 8. Same, labium and maxilla (nymph), from below; 9. Same, mandibles (nymph) from above.

Scales.—A. Figs 1 and 3 (fig. 7 slightly more enlarged); B. figs. 2, 4–6, 8, 9.

Ribaga on the distal segments of the flagellum in *Dorypteryx albicans* Rib. 1907, and recently such spines somewhat resembling those of the present insect have been detected by Womersley in the *Campodeidae* (E.M.M. 1928, lxiv, p. 65). Of phylogenetic interest is the occurrence of wing rudiments in the nymph, a phenomenon only once previously recorded in connection with an apterous Psocid (*Hyperetes britannicus* Harrison, 1916).

This species is distinguishable from all other described members of the sub-family, except *Pachytroctes brunneus* Rib., by the body ciliation, and from the named species by the colour and, apparently, by the relatively larger eyes.

3. *Caecilius* ———? sp.

One nymph in the last instar of a yellowish species with black eyes.
Length (in alcohol) 1·72 mm.

NEW HEBRIDES : Espiritu Santo, Hog Harbour, 23rd May 1927.

4. ——— ———? gen. et sp.

A last instar nymph of a winged species, its relationship not certainly determinable. It has somewhat the facies of an *Ectopsocus,* but differs in several respects from the respresentatives of that genus. The tarsal structure suggests Caeciliid affinities. Colour brownish, hirsute.

Length 1·37 mm.

NEW HEBRIDES : Espiritu Santo, Hog Harbour, 9th March 1927.

9 West Mall, Clifton, Bristol.

March 1928.

A CONTRIBUTION TO THE STUDY OF THE INSECT FAUNA OF THE ISLE OF MAN.

BY K. G. BLAIR, B.SC., F.E.S.

The fauna and flora of the Isle of Man is of peculiar interest to students of all branches of natural history on account of the special advantages it affords for the study of distribution. It is generally supposed that during the Glacial period the whole island was covered by the ice-sheet, the movements of which smoothed down the contours, widening the valleys and rounding off the hills, but which effectually extinguished all life in the district. Whatever life we now find there must then have arrived subsequently to the disappearance of the ice, some of it at least by means of land connections, which remained for some time, with the neighbouring districts of Scotland, England, Wales and Ireland. How long these connections remained, and in what order they were interrupted by the encroachments of the sea, are points upon which light may be thrown by the study of the fauna and flora of the island in relation to those of the surrounding countries.

As regards the entomology of the island, many lists of captures

and species noted have been published, but these refer almost entirely to the Lepidoptera and Coleoptera; of other orders a few isolated records are all that exist.

It is with great pleasure therefore that we find that the Manx Museum in Part III of its Catalogue (1927) has issued lists of these two orders, based mainly on the collections in its possession, but also including the names of many further species recorded or reputed to have occurred in the island. It is unfortunate that these lists are not quite as complete as they might be, a good many records having apparently been overlooked. It is with the object of making them a little more complete that I bring forward such additional records as have come to my notice together with short lists of such further species as two brief holidays spent on the island enable me to add. I have also to thank my friend Mr. J. L. Henderson for a list of beetles collected by Mr. C. I. Paton and now in his collection.

LEPIDOPTERA. The Rev. H. A. Stowell's list of Lepidoptera (infra) contains the following names* which do not figure in the Manx Museum Catalogue :—

Nudaria mundana, Noctua brunnea, N. rubi, N. castanea var. *neglecta, Mamestra trifolii, Hydroecia nictitans, Lithophane socia, Hypenodes costae-strigalis, Pseudoterpna pruinata, Ortholitha limitata, Thera firmata* and *Boarmia cinctaria.*

My own captures include the following additional species :—

Eumichtis protea, Rivula sericealis, Zanclognatha tarsipennalis, Acidalia immutata, A. virgularia, Cidaria pyraliata, Xanthorrhoë sociata and *Perizoma alchemillata,* thus bringing up the total to 321.

Another capture worth recording is a fine black ♂ of *Rusina tenebrosa*, for the identification of which I am indebted to Mr. W. H. T. Tams.

COLEOPTERA. The earliest list of any length was that published by Stowell, most of whose records are included in the list now published by the Manx Museum. Subsequent lists were published by Dr. J. W. Ellis, J. R. Le B. Tomlin, and numerous notes in the Ent. Mo. Mag., with a longer paper on 'The Coleoptera of the Isle of Man' as a vice-president's address to the Lancashire and Cheshire Entomological Society, by Dr. J. H. Bailey. The latter is a most interesting review of the subject, in which, though no complete list of the beetles is given, most of the species known to him to occur in the island are mentioned with a brief note of their habitat.

The Manx Museum list is based upon Dr. Bailey's collection, now in their possession, but many species recorded by other col-

* Altered, where necessary, to conform with South's 'Moths of the British Isles.'

lectors are also included. In the following list are included such additional published records as have come to my notice, together with the place of publication, as well as the names of further species collected by Mr. Paton and myself.

Dyschirius thoracicus, Amara ovata v. *adamantina* (Paton), *Bembidium pallidipenne, Demetrias atricapillus, Brychius elevatus, Coelambus inaequalis, C. impressopunctatus, Hydroporus septentrionalis, H. erythrocephalus, H. umbrosus, Gyrinus urinator, G. marinus, Cymbiodyta marginellus, Helochares punctatus* (Paton), *Hydrochus angustatus, Ochthebius pygmaeus, Hydraena riparia, Homalota luteipes* (Tomlin), *H. cauta* (Tomlin), *Falagria sulcata* (Bailey), *F. sulcatula* (Bailey and Ellis), *Tachyporus formosus, Tachinus pallipes, Ocypus brunnipes* (Paton), *Stenus morio, S. declaratus* (Tomlin), *Bledius atricapillus, Ancyrophorus aureus* (Paton), *Homalium salicis* (Stowell), *H. vile, Anisotoma badia* (Tomlin), *Necrophorus vespillo, Choleva chrysomeloides* (Tomlin), *Halyzia 18-guttata, Cryptophagus cellaris* (Tomlin), *Atomaria analis* (Tomlin), *Phyllopertha horticola* (Paton), *Anomala aenea, Telephorus flavilabris, Trigonogenius globulus* (Bailey), *Adimonia tanaceti, Phaleria cadaverina* (Paton), *Anthicus angustatus* (Ellis) (possibly identical with *A. scoticus* of Bailey), *Otiorrhynchus atroapterus* (Paton and myself), *Sitones suturalis* (Stowell) and *Ceuthorrhynchus marginatus* (Bailey), making a total of 836.

Myrmecopora uvida; Bailey's earlier record of this species was subsequently corrected to *M. brevipes* (Ent. Mo. Mag., 1909, p. 63).

The papers in which these records may be found are as follows :—

Stowell, H. A.—The Zoologist, 1862, p. 7895.

,, ,, Thwaites' 'Isle of Man,' 1863 (with several additions to the previous list).

Ellis, J. W.—Journ. Isle of Man Nat. Hist. Soc. II, 1892, p. 45.

Tomlin, J. R. Le B.—Ent. Mo. Mag. 1905, p. 252.

Bailey, J. H.—Proc. Lancs. & Chesh. Ent. Soc. 1907, p. 18.

It is much to be hoped that the publication of these lists by the Manx Museum will stimulate the study of Entomology by residents in the island, and that active collecting in other orders will in time enable the Museum to issue still further lists, so that the peculiarly interesting fauna of Man, and its limitations, may be known and analysed, and the evidence that it affords for the study of the problems of distribution duly weighed.

120 Sunningfields Road, Hendon, N.W.4.

March 24th, 1920.

Oxypoda vicina Kr. (humidula Kr.) withdrawn from the British List.—Being doubtful of the identification of the specimens in my collection standing under this name, I sent one of them to Col. Deville for his opinion. Col. Deville returned it as *O. induta* Rey = *O. pectita* Sharp, at the same time most kindly sending me two specimens of *O. vicina,* which is quite distinct. As *O. vicina* was introduced to the British List on my specimens, it will have to be withdrawn.—B. S. Williams, 15 Kingcroft Road, Harpenden; *May 16th,* 1928.

Occurrence of Lithostygnus serripennis Broun, a New Zealand Colydiid beetle, at Reigate.—Before leaving Reigate last year I went through an accumulation of cellar rubbish, in particular for *Cartodere filiformis* and *Corticaria crenicollis*, which had previously occurred therein. Among the usual cellar beetles taken was a minute insect of Latridiid aspect, quite unknown to me. I submitted this specimen to Mr. K. G. Blair, of the British Museum (Natural History), who recognised it as belonging to the New Zealand genus *Lithostygnus*. I have now to thank my friend, Commander J. J. Walker, who concurs with Mr. Blair that the insect is *Lithostygnus serripennis* Broun. I am at a loss to explain its presence in my wine cellar, as I had no produce of New Zealand in stock, and can only surmise that this very small species was introduced with other packing, although it was alive when taken.—C. E. Stott, Armitage, Staffs. : *May 1st*, 1928.

[The genus *Lithostygnus* (Colydiidae) was established in 1886 by Major Broun (Manual N.Z. Coleoptera, p. 950) for *L. costatus* Br., a minute insect 'undoubtedly allied to the European *Langelandia*,' which was found among decaying vegetable matter at Howick, in the North Island of New Zealand; and two other specimens of the genus, *L. serripennis* and *L. cuneiceps*, were subsequently described by him (Bull. N.Z. Institute, I, iii, pp. 185–6). These three species, the types of which are now in the Natural History Museum at South Kensington, are closely similar to each other, and are remarkable for their minute size (about 1½ mm.), the largely developed and laterally expanded prothorax, and the boldly sculptured and costate elytra. I possess a specimen of *L. cuneiceps* from Ophir, South Island, which was given to me in New Zealand under the name of *Metophthalmus asperatus* Woll., a Madeiran Latridiid to which it bears a certain superficial resemblance. All of them appear to be of very retiring habits and exceedingly scarce; and how a member of this recondite Antipodean genus has managed to find its way to the South of England must, I think, remain an unexplained mystery for the present.—J.J.W.]

A moorland form of Carabus nitens L.—As a general rule, the specimens of *C. nitens* which occur on our northern moors are decidedly smaller and darker than the specimens which occur either in the south or in less elevated localities, the difference being manifest in both sexes. The average length in my moorland specimens is 14 mm., and in the southern specimens 17 mm., while the difference in brilliance is most marked, one specimen from Egglestone in Teesdale being almost black and approaching var. *niger* Semenow. The difference is obvious in Yorkshire specimens, examples from Teesdale, the Cleveland Moors and our local Scorborough moorlands belonging to the small dark form, while examples from the low commons south of the Wolds, *e.g.*, Allerthorpe Common and Skipworth Common, belong to the larger, more brilliant form. I have, however, taken one specimen of the latter at an elevation of 800 feet on Eston Nab, near Middlesbrough (20.iv.27), so that there is not complete segretion of the two forms. I suggest for the smaller, darker race the name of *alticolens*.—Geo. B. Walsh, Linthorpe, Stepney Drive, Scarborough : *May 5th*, 1928.

Early Micro-Lepidoptera in the Isle of Wight.—While staying at Ventnor in the first half of April, 1928, I paid several visits (daily from April 5th to 9th, and again on April 12th) to the southern slope of St. Boniface Down, and was interested to see how many Micro-Lepidoptera were already on the wing in that sunny locality, no doubt as a result of the long spell of mild weather. *Pyrausta cespitalis* Schiff. was common, and one was noticed to be already in worn condition on April 6th. On that date a male *Eucosma fractifasciana* Hw. was also found, and two days later a female of the same species was captured, as well as several males. A single specimen of *Phthorimaea acuminatella* Sirc. was

taken on April 9th. An example of *Mompha misella* Schiff. occurred among *Helianthemum Chamaecistus* on April 6th, and several on the 12th, the leaf mining larvae of this species being common at the same time. *Elachista stabilella* Fr. and *E. nigrella* Hw. (mostly the form described as *E. consortella* Stt. in the first edition of Mr. Meyrick's 'Handbook') were frequent on the turf from the 5th onwards. Among hawthorn *Nepticula ignobilella* Stt. was found from the 6th onwards, *Ornix anglicella* Stt. and *Lithocolletis oxyacanthae* Fr. from the 8th, several specimens of each being taken. *Lithocolletis messaniella* Z. was common enough among *Quercus ilex*. *Pancalia leuwenhoekella* L. and *Incurvaria muscalella* F., which had been noticed in the same spot on April 19th of the previous year, were expected, but not met with. In a neighbouring locality *Gracilaria syringella* F. and *Elachista rufocinerea* Hw. (males) were on the wing on April 9th. Hibernating species were represented by *Depressaria capreolella* Z. (rather common), *D. rotundella* Dgl. (one on April 6th), *D. purpurea* Hw., *Cerostoma caudella* L. (one on April 9th) and *Acrolepia granitella* Tr. (common). The number of specimens seen was more remarkable than the number of species, and none of the species seen could be described as uncommon. Possibly it is only my imperfect acquaintance with south-coast localities in spring which makes me regard this abundance of small moths so early in the season as somewhat exceptional.—E. G. R. WATERS, 184 Woodstock Road, Oxford: *May 6th*, 1928.

Society

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, March 21st*, 1928.—Mr. J. E. COLLIN, President, in the Chair.

The following were elected Fellows of the Society:—Major C. P. Bradshaw, Cavalry Club, Piccadilly, W.; R. C. R. Crewdson, The Grange, Delamere, Northwich, Cheshire; H. O. Francis, 5 East Barnet Road, New Barnet, Herts.; W. V. Harris, Asst. Entomologist, Dept. of Agriculture, Monogoro, Tanganyika Territory; G. Salt, The Bussey Institution, Forest Hills, Boston, Mass., U.S.A.; A. E. Minter, 148 West End Avenue, Harrogate.

Mr. N. D. Riley, on behalf of Professor J. W. Heslop Harrison, communicated some notes on Melanism criticising a communication of Mr. W. Mansbridge on this subject. Mr. H. Donisthorpe gave an account, illustrated by diagrams, of homologies of the mouth parts of some insects. Capt. A. F. Hemming exhibited and discussed a new Indian species of the genus *Lycaenopsis*. Professor E. B. Poulton discussed or communicated the following: (1) Dr. V. G. L. van Someren on intermediates between *Danaida formosa* and *D. mercedonia* in the area between their respective ranges; (2) A reversal of the usual Geometrid twig-like attitude in a leaf stalk-like larva of the genus *Cabera*; (3) The Madeiran moth *Blastobasis lignea* Wlsm., taken in N.E. Ireland in 1902; (4) Some methods of collecting Lepidoptera, by Dr. V. G. L. van Someren; (5) Notes bearing on Unisexuality in insects, by Dr. J. W. Munro.

The following papers were read:—(1) 'A Permian fossil damselfly from the Falkland Islands,' by Dr. R. J. Tillyard, F.R.S.; (2) 'Some remarks on the Devonian fossil insects from the Rhynie Churst Beds, Old Red Sandstone,' by Dr. R. J. Tillyard, F.R.S.; (3) 'Revision of the European Bees allied to *Psithyrus quadricolor*,' by O. W. Richards, B.A.; (4) 'Notes on the Odonata of Yunnan, with descriptions of new species,' by Mr. K. J. Morton; (5) 'Collected records relating to insect migration,' by Mr. C. B. Williams, M.A.; (6) '*Sloperia ahmed* and *Tuttia leuseae*, two rare Algerian Hesperids,' by Mr. A. Goodman; (7) 'On the abdominal glands in certain N. American Argynnids,' by Dr. H. Eltringham, M.A.; (8) 'Two Japanese aquatic glow-worms,' by Mr.

Okada (communicated by Mr. K. G. Blair); (9) 'Odonata of the African Continent,' by Lt.-Col. F. C. Fraser, I.M.S.; (10) 'Polymorphism in horned beetles,' by Mr. G. J. Arrow; (11) 'The variability of species in the Lepidoptera, with reference to abundance and sex,' by Dr. R. A. Fisher and Mr. E. B. Ford; (12) 'On the systematic position of *Anomoses* (Lepidoptera, Homoneura),' by Mr. A. Philpott.—S. A. Neave, *Hon. Sec.*

BRITISH GALL MIDGES. II. *LESTODIPDOSIS* Kieffer.

BY H. F. BARNES, B.A., F.E.S.

(*Continued from p.* 76.)

KEY FOR THE SEPARATION OF SPECIES.

A. MALES.

A. Stem of 3rd flagellar segment not more than 1½ times as long as broad.

B. Stem of 12th flagellar segment over 1½ times and not more than 2½ times as long as broad.

(Stem of 10th flagellar segment over 2½ times and not more than 4 times as long as broad; palpi not readily visible in type slide.)

acanthoidis sp. n.

(type, Cecid. 311).

BB. Stem of 12th flagellar segment over 3½ times and not more than 5 times as long as broad.

(Stem of 10th flagellar segment over 2½ times and not more than 4 times as long as broad; 3rd palp segment over 2½ times and not more than 3½ times as long as broad, 4th palp segment 4½ times and not more than 5 times as long as broad, and about 1½ times as long as 3rd.)

traili sp. n.

(type, Cecid. 317; paratypes, Cecid. 318, 253, 481).

AA. Stem of 3rd flagellar segment over 1½ times and not more than 3 times as long as broad.

B. Stem of 10th flagellar segment over 1½ times and not more than 2½ times as long as broad.

C. 3rd palp segment about 1½ times as long as broad.

(4th palp segment about 1½ times as long as broad, and 1½ times as long as 3rd; stem of 12th flagellar segment 3 to 3½ times as long as broad.)

rosarum sp. n.

(type, Cecid. 335).

CC. 3rd palp segment 2 to 2½ times as long as broad.

(4th palp segment over 3 times and not more than 3½ times as long as broad, and slightly longer than 3rd; stem of 12th flagellar segment about 3 times as long as broad.)

pyri sp. n.

(type, Cecid. 504; paratypes, Cecid. 505, 506).

BB. Stem of 10th flagellar segment over 2½ times and not more than 4 times as long as broad.

C. Stem of 12 flagellar segment over 1½ times and up to 2½ times as long as broad.

D. 3rd palp segment 2 to 2½ times as long as broad.

(4th palp segment over 3½ times and not 4½ times as

long as broad, and just under 1½ times as long as 3rd.)

miki sp. n.

(type, Cecid. 308; paratype, Cecid. 106).

DD. 3rd palp segment 2½ to 3½ times as long as broad.

(4th palp segment about 3½ times as long as broad, and slightly longer than 3rd.)

L. pini sp. n.

(type, Cecid. 63; paratypes, Cecid. 100, 102).

CC. Stem of 12 flagellar segment over 2½ times and not more than 3½ times as long as broad.

D. 3rd palp segment 2 to 2½ times as long as broad.

E. 4th palp segment over 4½ times and not more than 5 times as long as broad, and about 1½ times as long as 3rd.

viburni sp. n.

(type, Cecid. 337; paratype, Cecid. 500).

EE. 4th palp segment 3½ to 4 times as long as broad, and about 1½ times as long as 3rd.

macrorosae sp. n.

(type, Cecid. 303; paratype, Cecid. 301).

DD. 3rd palp segment over 2½ times and up to 3½ times as long as broad.

(4th palp segment about 5 times as long as broad, and about 1½ times as long as 3rd.)

pisi sp. n.

(type, Cecid. 327; paratypes, Cecid. 108, 492).

CCC. Stem of 12th flagellar segment 3½ times and not more than 5 times as long as broad.

D. 3rd palp segment over 2½ times and up to 3½ times as long as broad.

E. 4th palp segment 2 to 2½ times as long as broad, and equal to or slightly shorter than the 3rd.

achilleae sp. n.

(type, Cecid. 323; paratypes, Cecid. 319, 321.).

EE. 4th palp segment 3½ to just over 4 times as long as broad, and about one-third again as long as 3rd.

aprimiki sp. n.

(type, Cecid. 392; paratypes, Cecid. 393, 495).

EEE. 4th palp segment 4½ times and not more than 5 times as long as broad, and over 1½ times as long as 3rd.

frireni Kieff.

(Cecid. 411).

CCCC Stem of 12th flagellar segment over 5 times as long as broad.

(3rd palp segment over 2½ times and not more than 3½ times as long as broad, 4th palp segment over 3½ times and not 4½ times as long as broad, and slightly longer than 3rd.)

jacobeae sp. n.

(type, Cecid. 315; paratypes, Cecid. 316, 57, 107).

B. Females.

A. Neck of 3rd flagellar segment 2½ to 3 times as long as broad.

(Neck of 10th flagellar segment 2 to 3 times as long as broad, 12th flagellar segment 2½ to 3½ times as long as broad at its base; 3rd palp segment 2 to 2½

times as long as broad, 4th palp segment 2 to 3 times as long as broad and slightly longer than 3rd.)

pini sp. n.

(type, Cecid. 374; paratypes, Cecid. 375, 47, 101, 103).

AA. Neck of 3rd flagellar segment 3 to 4 times as long as broad.

(Neck of 10th flagellar segment 3 to 4 times as long as broad, 12th flagellar segment about 2½ times as long as broad at its base; 3rd palp segment over 2½ times and not 3 times as long as broad, 4th palp segment over 3 times and not more than 3½ times as long as broad, and equal in length to the 3rd.)

achilleae sp. n.

(type, Cecid. 322; paratypes, Cecid. 320, 319).

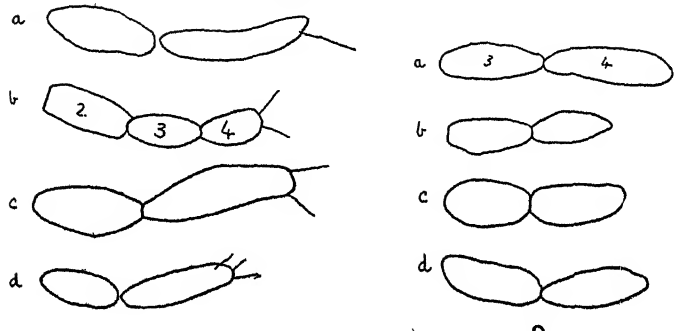


Fig. 4.

3rd and 4th palp segments of (A) *L. pisi*, (B) *L. achilleae*, (C) *L. pyri*, (D) *L. miki*.

AAA. Neck of 3rd flagellar segment 3½ to 4½ times as long as broad.

B. Neck of 10th flagellar segment 3½ to 4½ times as long as broad.

(12th flagellar segment about 3 times as long as broad at its base; 3rd palp segment over 2½ times and not 3½ times as long as broad, 4th palp segment over 3½ times and not 4½ times as long as broad, and slightly longer than 3rd.)

solani sp. n.

(type, Cecid. 336).

BB. Neck of 10th flagellar segment 4½ to 5½ times as long as broad.

C. 12th flagellar segment about 3 times as long as broad at its base.

(Palp portions as above.)

solani sp. n.

CC. 12th flagellar segment about 3½ times as long as broad at its base.

D. 3rd palp segment over 2½ and not 3½ times as long as broad, 4th palp segment over 3½ times and not 4½ times as long as broad, and about 1½ times as long as 3rd

plicatricis sp. n.

(type, Cecid. 332).

DD. 3rd palp segment 3 times as long as broad, 4th palp segment over 4½ times as broad and about one-third as long again as 3rd.

hieracii sp. n.

(type, Cecid. 330; paratype, Cecid. 218).

CCC. 12th flagellar segment about 4 times as long as broad at its base.
(3rd palp segment over 2½ times and not 3½ times as long as broad, 4th palp segment over 5½ times and not more than 6½ times as long as broad, and about about 1½ times as long as 3rd.)
jacobeae sp. n.
(type, Cecid. 314; paratype, Cecid. 501).

BBB. Neck of 10th flagellar segment 5½ to 6½ times as long as broad.
C. 12th flagellar segment about 3 times as long as broad at its base.
D. 3rd palp segment over 2½ times and not 3½ times as long as broad.
E. 4th palp segment over 3 times and not more than 3½ times as long as broad.
(4th palp segment equal in length to 3rd palp segment.)
miki sp. n.
(type, Cecid. 309; paratypes, Cecid. 48, 310).

EE. 4th palp segment over 4½ times and not more than 5½ times as long as broad.
(4th palp segment just under 1½ times as long as 3rd palp segment.)
lanceolatae sp. n.
(type, Cecid. 330; paratype, Cecid. 281).

CC. 12th flagellar segment about 3½ times as long as broad at its base.
D. 3rd palp segment about 2 to 2½ times as long as broad.
(4th palp segment over 3½ times and not more than 4 times as long as broad, and almost equal in length to the 3rd.)
giardi Kieff.
(Cecid. 349, 476, 59).

DD. Other palp proportions.
hieracii, sp. n.

CCC. 12th flagellar segment about 4½ times as long as broad at its base.
D. 3rd palp segment about 2 to 2½ times as long as broad.
(4th palp segment about 3 times as long as broad, and slightly longer than 3rd.)
pyri sp. n.
(type, Cecid. 324; paratypes, Cecid. 507, 508).

DD. 3rd palp segment 3½ times and not more than 4½ times as long as broad.
(4th palp segment just over 5 times as long as broad, and slightly longer than 3rd.)
frireni Kieff.
(Cecid. 412, 413).

BBBB. Neck of 10th flagellar segment 6½ to 7½ times as long as broad.
(12th flagellar segment about 4½ times as long as broad at its base; palp proportions as above.)
pyri sp. n.

AAAA. Neck of 3rd flagellar segment 4½ to 5½ times as long as broad.
B. Neck of 10th flagellar segment 3½ to 4½ times as long as broad.
(3rd palp segment 3½ times and not more than 4½ times as long as broad, 4th palp segment 3 to 3½ times as long as broad, and slightly longer than 3rd.)
hordei sp. n.
(type, Cecid. 331).

BB. Neck of 10th flagellar segment 4½ to 5½ times as long as broad.
C. 12th flagellar segment not 3 times as long as broad at its base.
(3rd palp segment over 2½ times and not 3½ times as long as broad, 4th palp segment over 4½ times and not 5½ times as long as broad, and just over 1½ times as long as 3rd.)
affinis sp. n.
(type, Cecid. 334; paratype, Cecid. 116).
CC. 12th flagellar segment about 3 times as long as broad at its base.
(3rd palp segment over 2½ times and not 3½ times as long as broad, 4th palp segment over 3½ times and not 4½ times as long as broad, and slightly longer than 3rd.)
trifolii sp. n.*
(type, Cecid. 338).
CCC. 12th flagellar segment about 4 times as long as broad at its base.
(Palp proportions as in *trifolii* sp. n.)
pisi sp. n.
(type, Cecid. 326; paratypes, Cecid. 325, 55, 493, 494).
BBB. Neck of 10th flagellar segment 5½ to 6½ times as long as broad.
C. 3rd palp segment about 2 to 2½ times as long as broad.
D. 4th palp segment over 3½ times and not more than 4 times as long as broad.
(12th flagellar segment about 2½ times as long as broad at its base; 4th palp segment about 1½ times as long as 3rd.)
acanthoidis sp. n.
(type, Cecid. 312; paratypes, Cecid. 60, 480).
DD. 4th palp segment about 4½ times as long as broad.
(12th flagellar segment missing in type; 4th palp segment just under 1½ times as long as 3rd.)
tragopogonis sp. n.
(type, Cecid. 328).
CC. 3rd palp segment over 2½ times and not 3½ times as long as broad.
D. 4th palp segment over 3 times and not more than 3½ times as long as broad.
(12th flagellar segment about 3 times as long as broad at its base; 4th palp segment equal to 3rd in length.)
miki sp. n.
DD. 4th palp segment over 3½ times and not 4½ times as long as broad.
(12th flagellar segment about 3 times as long as broad at its base; 4th palp segment slightly longer than 3rd.)
cirsii sp. n.
(type, Cecid. 313; paratypes, Cecid. 49, 496).
BBBB. Neck of 10th flagellar segment over 6½ times and not more than 7½ times as long as broad.
(3rd palp segment 3½ times and not more than 4½ times as long as broad, 4th palp segment 3 to 3½ times as long as broad, and slightly longer than 3rd; 12th

* This specimen has previously (Ent. Mo. Mag., lxi, p. 246, 1925) been wrongly recorded as *Tricholaba trifolii* Rubs.

flagellar segment $3\frac{1}{2}$ to 4 times as broad at its base.)
muricatae sp. n.
(type, Cecid. 329).

AAAAA. Neck of 3rd flagellar segment $5\frac{1}{2}$ to $6\frac{1}{2}$ times as long as broad.

B. Neck of 10th flagellar segment $4\frac{1}{2}$ to $5\frac{1}{2}$ times as long as broad.

C. 12th flagellar segment not 3 times as long as broad at its base.
(3rd palp segment over $2\frac{1}{2}$ times and not $3\frac{1}{2}$ times as long as broad, 4th palp segment over $4\frac{1}{2}$ times and not $5\frac{1}{2}$ times as long as broad, and just over $1\frac{1}{2}$ times as long as 3rd.)
affinis sp. n.
(type, Cecid. 334; paratype, Cecid. 116).

CC. 12th flagellar segment about 3 times as long as broad at its base.
(3rd palp segment over $2\frac{1}{2}$ times and not $3\frac{1}{2}$ times as long as broad, 4th palp segment over $3\frac{1}{2}$ times and not $4\frac{1}{2}$ times as long as broad, and slightly longer than 3rd.)
trifolii sp. n.

BB. Neck of 10th flagellar segment $5\frac{1}{2}$ to $6\frac{1}{2}$ times as long as broad.
(3rd palp segment over $2\frac{1}{2}$ times and not $3\frac{1}{2}$ times as long as broad, 4th palp segment over $3\frac{1}{2}$ times and not $4\frac{1}{2}$ times as long as broad, and slightly longer than 3rd; 12th flagellar segment about 3 times as long as broad at its base.)
cirsii sp. n.

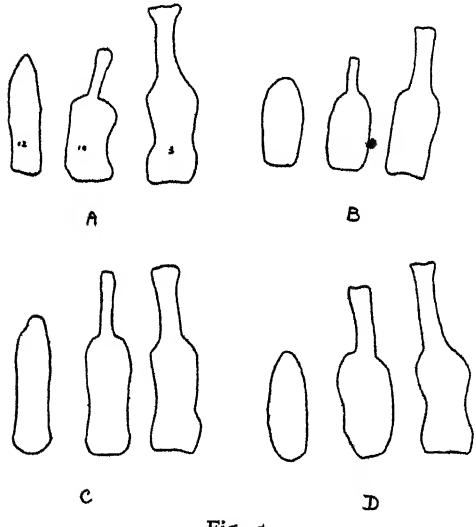


Fig. 5.

Outlines of flagellar segments of female (A) *L. pisi*, (B) *L. achilleae*, (C) *L. pyri*, (D) *L. hordei*.

SUMMARY.

Twenty-four new species of *Lestodiplosis* Kieff. have been described. Several of these may be of economic importance in holding in check outbreaks of injurious midges. For example, *L. pyri* sp. n. lives in its larval stage at the expense of *Dasyneura pyri* Bouché, *L. pisi* sp. n. lives on the larvae of *Contarinia pisi* Winn., *L. trifolii* sp. n. attacks *Dasyneura trifolii* F. Lw., and *L. hordei* sp. n. attacks *Colomyia hordei* Barnes. Others of the genus attack beneficial midges; for example, *L. cirsii, lanceolatae* and *acanthoidis* spp. n., whose larvae feed on midge larvae which help in diminishing the number of potential thistle seed: and two species, *L. pini* and *macrorosae* spp. n. are thought to feed on other gall midges which feed on aphides. Still others feed on other midges which so far as is known are of no great importance because they feed on wild plants of no economic value.

CORRIGENDUM.—On p. 74 *antea*, lines 14 and 15 from bottom, for '*Dasyneura achilleae* Kieff.' read '*Macrolabis achilleae* Rubs.'; and on line 7 from bottom, read '*Macrolabis achilleae* Rubs.'

South-Eastern Agricultural College, Wye, Kent.

May 18th, 1927.

XANTHOLINUS LINEARIS OL. AND *X. LONGIVENTRIS* HEER.

BY THE REV. C. E. TOTTENHAM, M.A.

The object of these remarks is to show that *X. longiventris* Heer should be given specific rank, instead of being treated as a mere variety of *X. linearis* Ol., as is generally done in literature and in the recent catalogues. Coming across the two species in quantities in flood refuse at the beginning of this year, I took the opportunity to examine a very large number of both, about two hundred in all, and the following are the conclusions I have arrived at through these observations.

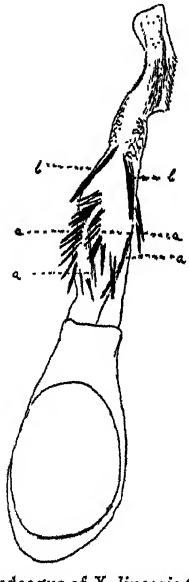
Firstly, although *X. longiventris* is as a rule slightly darker than *X. linearis*, this is a very variable character and cannot be relied upon for the determination of the two. Neither can the dorsal series of the thoracic punctures be rearded as a satisfactory character, although the general tendency is for these to be more numerous in *X. linearis*. But since specimens of *X. longiventris* occur with more punctures than some specimens of *X. linearis* this characteristic is of no practical value.

Secondly, there are certain characteristics which seem to be sufficiently permanent to justify the separation of the two as distinct species. The elytra in *X. longiventris* are slightly longer, a point which can be appreciated by comparison; also they are not so strongly and more sparingly punctured than in *X. linearis*, the

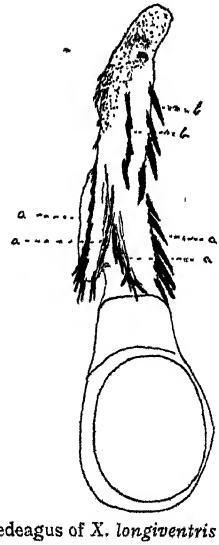
space between the punctures being smoother and consequently more shiny. I found I was able to separate all the specimens examined by the puncturation of the elytra alone. But by far the easiest and most definite distinguishing characteristic is that pointed out in Johnson and Halbert's list of Irish Beetles (p. 657). When examined under a high power it will be seen that in *X. linearis* the surface of the thorax between the punctures is covered with fine transverse scratches, whereas in *X. longiventris* it is quite smooth and consequently more shining. These lines can just be noticed with a lens which will magnify fifteen diameters, but when seen under a higher power they form a character which enables the two species to be at once easily distinguished.

In view of the abundant difference between the two insects as shown by the above distinguishing features, there seems to be no reasonable ground for not regarding them as distinct species. And that one must so do is further proved by the study of the aedeagus.

The aedeagus is bulbous in form, narrowing at the apex to a wide bottle-neck; the dorsal surface of the bulb consists of a circular plate, separate from the ventral surface, which extends round the bulb on all sides. By pressure, in fresh specimens, the internal sac can be evaginated from the opening at the apex of the bulb, and it is in the armature of the internal sac that a marked difference between the two species will be found. In both species, on



Aedeagus of *X. linearis* Ol.



Aedeagus of *X. longiventris* Heer.

the basal portion (when evaginated) of the sac there are two rows of strong spines on opposite surfaces of the sac (four rows in all). In *X. linearis* these spines are more slender and a few more in number. These rows are marked *a* in the accompanying figures. Beyond them, towards the apex, the sac is slightly narrowed and widened again, before being narrowed once more to the apex. On this widened portion some more strong spurs will be found. In *X. longiventris* there are two rows each consisting of four or five of these, whereas in *X. linearis* there are only present the two basal spines, these being much longer (*b* in fig.). In addition to the differences in the armature of the internal sac, the two species appear also to differ somewhat in the shape of the bulb, which is longer in *X. linearis*, the dorsal plate being less circular in outline. With these differences in the aedeagus *X. linearis* and *X. longiventris* must undoubtedly be regarded as two distinct species.

A remarkable fact in connection with the large number of these beetles met with in flood-refuse at Richmond in January last was that, although in *X. longiventris* the proportion of the sexes was about equal, in *X. linearis* only three per cent. were males, the two species being equally abundant.

60 Mt. Ararat Road, Richmond, Surrey.

June 18th, 1928.

COLEOPTERA IN NORTH-EAST CO. DUBLIN.

BY EUGENE O'MAHONY.

The majority of the following beetles are rare or local or not recorded for the county in 'A List of the Beetles of Ireland,' by the Rev. W. F. Johnson and J. N. Halbert (Proc. R.I. Acad., 1902). The localities mentioned are mostly on the coast; Balgriffan, Raheny and Swords are inland, and the North Bull is a sandy island to the north of Dublin Harbour connected to the mainland at its western end by a bridge. There is a fair amount of timber in the district and three or four small streams. Of marsh lands the principal are The Pits at Kilbarrack, the Bog of the Loughs in Howth, Raheny Quarries, the Brick-pits at Portmarnock and the Bog of the Ring in the north of the County.

Agonum thoreyi v. *puellum* Dj. occurred at the Pits, Kilbarrack, in stems of *Typha* in company with *Atheta* (*Alianta*) *incana* Er., *Stenus pallitarsis* Steph. and *Cyphon ochraceus* Steph. (*pallidulus* Boh.). *Bembidion aeneum* Germ., under stones on bank of River Mayne at Baldoyle, not common. *B. nitidulum* Marsh., Clontarf, local. *Pogonus chalceus* Marsh., Baldoyle, under stones on sea shore. *Metabletus foveola* Gyll., Portmarnock, on the dunes. *Brychius*

glabratus Villa (*elevatus* Panz.), Sluice River, Portmarnock, and River Mayne, Baldoyle, taken crawling on small branches and driftwood. *Haliplus immaculatus* Gerh., common at the Pits, Kilbarrack. *Hygrotus* (*Coelambus*) *5-lineatus* Zett. and *Coelambus impressopunctatus* Sch., Kilbarrack and the Bog of the Ring. *Hydroporus granularis* L., two at the Bog of the Ring. *Rhantus grapii* Gyll., Kilbarrack and Raheny Quarries. *Cymbiodyta marginella* Fab. (*ovalis* Thoms.), Kilbarrack and Raheny Quarries, plentiful. *Helophorus aequalis* Th., Kilbarrack, three or four. *H. griseus* Hbst., Kilbarrack and Knocknabohil, Howth, rare. *Ochthebius punctatus* Steph., North Bull, on the dunes and two or three at Sutton. I have one specimen from Portmarnock, caught on my coat while cycling. *O. lejolisi* Muls., Howth, Portmarnock and Malahide, common in the small pools in the boulders. *Sphaeridium scarabaeoides* F., var. *lunatum* F., Clontarf, Kilbarrack and Portmarnock, frequent. *S. bipustulatum* F., var. *marginatum* F., Portmarnock, local. *Cercyon tristis* Ill. (*minutus* Brit. Cat.), Kilbarrack, about a dozen taken in the spring of 1927.

Falagria thoracica Curt., Kilbarrack, rare. *F. sulcata* Payk., Kilbarrack and Howth. *Diglossa mersa* Hal., Baldoyle. *Leucoparyphus* (*Cilea*) *silphoides* L., Clontarf, in old hay and cut grass, local. *Mycetoporus longulus* Mann., Clontarf, frequent. *Heterothops dissimilis* Grav., North Bull, very common in tidal refuse for a short time in October. *Quedius maurorufus* Grav., Clontarf. *Q. fumatus* Steph., *Ontholestes* (*Leistotrophus*) *murinus* L. and *Philonthus intermedius* Boisd., Clontarf, not common. *P. umbratilis* Grav., Clontarf and Balgriffan, rare. *Cafius fucicola* Curt., South Cliffs, Howth, taken under seaweed. *Xantholinus tricolor* F., Clontarf and Kilbarrack, not common. *Othius laeviusculus* Steph., Kilbarrack and Howth. *O. myrmecophilus* Kies., North Bull, not common. *Dianous coerulescens* Gyll., Clontarf, in bed of River Nannikin. *Stenus guttula* Mull., Sluice River at Portmarnock, and Santry River at Raheny, crawling on stones and in moss; *S. cicindeloides* Grav., Kilbarrack, local; *S. incrassatus* Er., Kilbarrack and Clontarf, local. *S. binotatus* Ljun., Kilbarrack, under moss-covered stones. *Bledius spectabilis* Kr., North Bull, on the dunes and swept in the salt-marsh; *B. opacus* Block., also on the dunes, North Bull. *Homalium laeviusculum* Gyll., Howth, under seaweed. *H. caesum* Grav., Rush, in vegetable refuse. *Proteinus ovalis* Steph., Clontarf, by sweeping. *Megarthrus denticollis* Beck., Clontarf. *Tychus niger* Payk., Kilbarrack, in moss taken from under a whin bush. *Scydmaenus* (*Eumicrus*) *tarsatus* Mull., Clontarf, by sweeping. *Liodes* (*Anisotoma*) *dubia* Kug., North Bull. *Hister carbonarius* Ill., and *H. neglectus* Germ., Kilbarrack and Clontarf. *Pachylopus* (*Saprinus*) *maritimus* Steph., Portmarnock. *Epuraea deleta* Er., Clontarf, in fungi, rare. *E. obsoleta* F., Murrough, Portmarnock, rare. *E. angustula* Er., in fungi, Clontarf, rare. *Rhizophagus depressus* Er., Clontarf, under bark, not common. *R. perforatus* Er., Clontarf and Baldoyle; *R. dispar* Gyll., Clontarf, plentiful under bark. *Monotoma picipes* Hbst., Clontarf and Kilbarrack, by sweeping. *Telmatophilus typhae* Fall., Clontarf, three or four by sweeping, rare. *Antherophagus silaceus* Hbst.; since the first capture (in 1924) I have taken three more examples of this species at the original locality—the North Bull. (see E.M.M. 1926, p. 94). *A. pallens* Gyll., Clontarf, by sweeping, rare. *Atomaria mesomelaena* Hbst. (*mesomelas* Brit. Cat.), Kilbarrack and Clontarf. *Olibrus aeneus* F., Clontarf, Kilbarrack and Swords, not rare. *Corticaria elongata* Humm., Clontarf, by shaking old hay, not common. *Melanophthalma fuscula* Humm., North Bull, Kilbarrack, Portmarnock and Malahide, frequent. *Typhaea stercorea* Linn. (*fumata* L.) occurs in most of the localities mentioned, usually in single specimens. *Cis bidentatus* Ol., Clontarf, locally common. *Octotemnus glabriculus* Gyll., a

number taken in fungi on old tree-stump at the Donahies, Raheny. *Aphidecta (Adalia) obliterata* L., Clontarf, not common. *Pullus (Scymnus) suturalis* Thunb., Clontarf, by sweeping. *Heterocerus marginatus* F., Sutton, Baldoyle and North Bull.

Aphodius scybalarius F. occurs in most places. *A. granarius* L., Kilbarrack, rare. *A. pusillus* Hbst., Kilbarrack and Baldoyle. *Geotrupes spuniger* Marsh., common in most places. *G stercorarius* L., common. I picked up a specimen in Portmarnock which has the same metallic appearance as *G. mutator* Marsh., but had only seven striae between the suture and the humeral prominence. *Trixagus (Throscus) dermestoides* L., Kilbarrack and Raheny. *Cyphon padi* L., Clontarf, not common. *Scirtes hemisphaericus* L., Kilbarrack, one specimen *Cantharis (Telephorus) nigricans* Mull., *C. pellucida* F., Clontarf, local. *C. pallida* Goeze. (*bicolor* Brit. Cat.), common. *Dryophilus pusillus* L., Clontarf, frequent under larch. *Priobium excavatum* Kug. (*castaneum* Brit. Cat.), 'Swan's nest,' Raheny and Blackwood Lane, Portmarnock, not common. *Ernobius mollis* L., Clontarf, taken by sweeping. *Ptilinus pectinicornis* L., Clontarf, Raheny and Sutton. I find this species fairly generally distributed, in the Clontarf area it might be said to be common. *Ochina ptinoides* Marsh. (*hederae* Mull.), Clontarf, by sweeping, rather scarce.

Donacia vulgaris Zsch., Kilbarrack, by sweeping. *Gastroidea polygoni* L., Clontarf, Baldoyle and Raheny, local; Rush, one specimen by Mr. A. W. Stelfox. *Psylliodes cuprea* Koch., Clontarf, not common. *P. affinis* Payk., Clontarf and Kilbarrack. *Phyllotreta exclamationis* Thunb., Clontarf and Howth. *P. nigripes* F., Kilbarrack. *Longitarsis succineus* Foud. (*laevis* All.), Howth. *Choragus sheppardi* Kirby, Clontarf, under fallen chestnut leaves.

Otiorrhynchus auropunctatus Gyll., Clontarf, Kilbarrack, Portmarnock and Malahide. The greater part of the Clontarf habitat was destroyed in 1926–7 by road widening. *O. ovatus* L., Kilbarrack. *Brachysomus echinatus* Bonsd., Clontarf, only one specimen taken so far. *Sitona lineellus* Gyll. and *S. griseus* F., Kilbarrack, one specimen of the former occurred at the east end of the North Bull. *Barynotus moerens* Fab. (*elevatus* Marsh.), Kilbarrack. *Hylobius (Curculio) abietis* L., Clontarf, common under chips from felled pines; Sutton, one on workshop window. *Phytonomus (Hypera) arator* L. (*polygoni* L.), Drumleck Point, Howth, not common. *Tanysphyrus lemnae* F., Kilbarrack and Clontarf. *Orthochaetes setiger* Beck., Kilbarrack, one specimen taken by sweeping. *Acalles turbatus* Boh., Clontarf and Portmarnock. *Orchestes quercus* L., Clontarf, swept off oak.

Anoncodes (Nacerdes) melanura Schmidt., Cush Point, Sutton. *Sphaeriestes (Salpingus) aeneus* Steph. (*aeratus* Muls.), Clontarf, not common. *S. castaneus* Panz., Clontarf and Howth. *Rhinosimus viridipennis* Steph., Blackwood Lane, Malahide, under bark of fence pole. *R. ruficollis* L., Clontarf and Howth. *Meloe proscarabaeus* L. var. *cyaneus* Muls., Blackbanks, Raheny. *M. violaceus* Marsh, Raheny and Howth. *Phylan (Heliopathes) gibbus* F., Portmarnock and Rush. *Phaleria cadaverina* F., Portmarnock, two shaken out of roots of bents. *Crypticus quisquilius* L., Portmarnock and Sutton.

In the above list I have only recorded those species which I have taken myself, and I wish to thank Messrs. Halbert, Tomlin, Williams and Dr. Joy for their kindness in naming some of the critical species for me.

National Museum of Ireland, Kildare Street, Dublin.

May 24th, 1928.

SOME WEST INDIAN *APHIDIDAE*.

BY FRED. V. THEOBALD, M.A., F.E.S.

There seem to be so few records of West Indian Aphides that I refer here to the few I have in my collection. They were sent me by Professor Ballou and Mr. Gowdey.

Aphis gossypii Glover, on *Ipomoea* sp., Barbados, viii.05; Sour Sop (*Anona* sp.), Barbados, x.05; on Okra (*Hibiscus*), Flodden, Barbados, iv.11; on *Gaillardia* sp., Barbados, viii.05 (Ballou); Kingston, Jamaica, 20.viii.20 (Gowdey). The form on Okra, both in Barbados and Jamaica, is very small and delicate.

Aphis nerii Boyer. On Oleander in the Hope Gardens, Jamaica, 20.viii.20 (Gowdey).

Aphis maidis Fitch. On maize, Antigua, ix.13 (Ballou), and on maize in Jamaica (Gowdey).

Aphis illinoisensis Schimer. On grapes in Jamaica (Gowdey). This is usually placed in the genus *Macrosiphum* and in the same as Thomas' *viticola*. The West Indian specimens exactly agree with N. American specimens sent me labelled *Macrosiphum viticola* Thomas. They certainly do not belong to *Macrosiphum*, and as far as I can see are nearest *Aphis*.

Toxoptera aurantiae Koch. On Cacao flowers, Montserrat, v.11; Sour Sop or Custard Apple (*Anona*), Barbados, x.05 (Ballou).

Myzus persicae Sulzer. On cabbages, Jamaica (Ballou).

Idiopterus brasiliensis Moveira, on Barbados beans, Antigua, iii.11 (Ballou). This species, described from Brazil, can be distinguished from *Idiopterus nephrolepidis* by the cornicles being slightly swollen and darker at the apex than base; by the antennal only having sensoria on segment iii, none on iv and v, and by the slightly different wing venation.

Cerataphis lataniae Boisduval, on Palms in Montserrat, v.11, and on Raffia Palms, St. Lucia (Ballou).

Wye Court, Wye.

May 21st, 1928.

FURTHER NOTES AND DESCRIPTIONS OF NEW BRITISH *THYSANOPTERA*.

BY RICHARD S. BAGNALL, F.R.S.E., F.L.S.

(*Concluded from p.* 99.)

Thrips dorsalis Bagn.

1927 Ann. Mag. Nat. Hist., Ser. 9, xx, p. 576.

This is a pretty little species of the *tabaci* group, pale creamy yellow in colour, the abdominal tergites 3-7 being ornamented

with a transverse bar of greyish brown, making the species very distinctive in life. The antenna has joint 1 white, 2 light brown, 3 pale grey, 4 and 5 grey-brown distally but pale in the distal half or thereabouts, and 6 and 7 grey-brown, the relative lengths (and breadths) of 2-7 being 34(23·5) : 44(18) : 43(17) : 35(16) : 46(16) : 12·5(8) μ.

The setae are stout, straight, dark and pointed, and somewhat shorter than in *tabaci,* whilst the fringe of abdominal tergite 8 is complete, fragile, and the cilia only 10-14 μ in length as compared with 16-19μ in *tabaci.*

SURREY, Woldingham, in numbers on *Verbascum nigrum,* July 1924. I have also taken it in France and Spain.

Thrips frankeniae Bagn.

On *Frankenia,* Blakeney Point, Nov. 1927.

At my request Prof. F. W. Oliver, F.R.S., very kindly sent me specimens of *Frankenia laevis* for the purpose of searching for this insect. It was late in the year, but I succeeded in finding a sadly mutilated example consisting of the thorax and wing, the setae of the pronotum and fore-wing fortunately proving sufficient to confirm the species' identity. Originally described in 1926 from the Mediterranean, where it is probably common on *Frankenia* spp.

Baliothrips exilis sp.n.

Until I secure further material I do not propose to give more than a comparative description. The species closely resembles *B. dispar,* but is manifestly smaller and noticeably narrower, as the comparative measurements of the two examples now described and a typical example of *dispar* demonstrate.

	dispar.	*exilis.*	
		A.	B.
Head, length (and breadth)	155 (180)	138 (158)	135 (165)μ
Pronotum length (and breadth)	175 (250)	138 (192)	145 (202)μ
Mesothorax, breadth	320	250	258μ
Abdomen, breadth	350	258	258μ
Fore-wing, length (and middle breadth) ..	1030 (69)	715 (54)	756 (56)μ

The comparative lengths (and breadths) of the tibia are as follows :—

B. dispar .... I 140 (52) : II 135 (48) : III 184 (45)μ
B. exilis ..... I 125 (45) : II 100 (42) : III 152 (38),,

The chaetotaxy of the pronotum is as in *B. dispar,* and not as in *vittipennis* Bagn.,* and it should be noted that the posterior

* In the measurements given for *B. dispar* in my description of *B. vittipennis* (Ann. Mag. Nat. Hist., Ser. 9, xx, p. 575) the length of joint 4 is given as 43 instead of 48 μ, owing to an undetected typographical error.

margin of the pronotum in the former is furnished with either 2 (as described) or 3 pairs of microsetae in addition to the median larger pair. The relative lengths of the antennal joints 3-7 are as follows :—

B. dispar ..		55 (22) :	48 (23) :	41 (24·5) :	54 (24) :	24 μ
B. exilis ...	A.	43 (20) :	37 (22) :	35 (23) :	45 (23) :	22 ,,
	B.	46 (21) :	38 (21·6) :	38 (21·5) :	50 (21·5) :	24 ,,

The fore-wings are furnished with 20-22 costal setae and only 6 in the lower vein, whilst the upper vein has a basal series of 3+3 followed by 1 near middle and 1+1 distally, these wing setae being very fine.

It will be seen that the species is chiefly distinguished by its markedly more slender form, the shorter tibiae, the fewer wing setae, and the shorter antennal joints, especially joints 3 and 4.

CHESHIRE, Burnage Lane, Manchester, 19.viii.25, on *Holcus lanatus* L. (H. Britten).

Euchaetothrips kröli (Schille)=*ingens* Pr.

LANCS., Reddish Canal, 7.viii.21 (H. Britten); and NORTHUMBERLAND, Ryton-on-Tyne, viii.25, in both cases on *Glyceria aquatica*, ♀ ♀ only.

Sub-order *TUBULIFERA*.

Trichothrips amabilis Bagn.

The following are further records of the female only :—

Greatham and Cox Green, Co. DURHAM, under bark of willow; and Leeds Castle, KENT, under bark of elder, in each case with *T. semicæcus* Uz. Under bark of hawthorn stem, Balsham, 11.iii.1911 (*Rymer-Roberts*).

T. semicaecus Uz.

Hen Wood, OXFORD, June 1912, and Leeds Castle, KENT, 29.iii.1921, in both cases under bark of elder (*Sambucus*).

Phloeothrips coriaceus Hel.

I have recently shown that there is a second larger species, which I described under the name *immanis* from examples collected in Switzerland in 1925. The following are records of the true *P. coriaceus* :—

NORTHUMBERLAND and DURHAM, various records, and once in numbers at Hart with *P. immanis*, Feb. 1911; ESSEX, SURREY, SUSSEX and KENT, various records, once in numbers on cut pea-sticks at Coldharbour, near Leith Hill, July 1925; WARWICKSHIRE, in numbers on pea-sticks, Balsall Common, September 1912; OXFORD district, various records, OXFORDSHIRE and BERKSHIRE; HAMPSHIRE, New Forest.

Phloeothrips immanis Bagn.

1927 Ann. Mag. Nat. Hist., Ser. 9, xx, p. 582.

♀. Size larger, breadth comparatively greater (breadth of mesothorax 780 and abdominal segment III, 810μ); tube longer as compared with head (400 : 390μ in type specimen); postocular, fore-coxal and postero-angular pronotal setae longer (90, 90 and 148μ); intermediate antennal joints relatively longer, 3 about 3·3 times as long as broad; fore-wings with 36–40 more closely spaced duplicated cilia ..... *P. immanis* Bagn.

♀. Size smaller, breadth less (breadth of mesothorax 570 and abdominal segment III 600μ); tube shorter as compared with head (c. 340 : 364μ in typical example); postocular, fore-coxal and postero-angular pronotal setae shorter (54, 54 and 110μ); intermediate antennal joints relatively shorter, 3 approximately 3·0 times as long as broad; fore-wings with 24–30 less closely spaced duplicated cilia. *P. coriaceus* Hal.

Apart from the characters tabulated above, the cheeks of this species would appear to be more strongly and closely tuberculate. The relative lengths (and breadths) of the antennal joints 2-8 are approximately as follows :—

P. immanis ... 95 (44) : 175 (53) : 148 (52) : 127 (44·5) : 106 (35) : 84 (30) : 60 (20) μ
P. coriaceus .. 84 (42) : 148 (50) : 118 (50) : 104 (40) : 88 (34) : 69 (31) : 57 (20) ,,

The following are British records :—

DURHAM, Hart, February 1911, both sexes; OXFORD district, Wytham, Cothill, 15.vi.1912, 1 ♀ and 1 ♂ (R.S.B.), and Headington, OXFORD, 1 ♀ on window, 9.viii.1914 (H. Britten); SURREY, Boxhill, 1 ♀, by sweeping, July 1924.

Hoplandrothrips ellisi Bagn.

Priesner relegates *ellisi* to a form of *H. bidens* Bagn., a species I have not yet recognised as British. I have, however, taken both *ellisi* and *bidens* in the South of France, and am satisfied that they are valid species as set out on p. 585 in part III of my *Contributions Towards a Knowledge of the European Thysanoptera.* They may be recognised by the following table relating to the ♂ only :

Fore-tibiae with a strong tooth very near base within; postocular and postero-angular pronotal setae longer (100–130μ); all basal setae of fore-wing blunt, 2 noticeably longer than 1 and 3, relative lengths 68·6 : 86·4 and 77μ* ..... *H. ellisi* Bagn.

Fore-tibia simple; postocular and postero-angular pronotal setae shorter (70–95μ); first 2 basal setae of fore-wing erect, blunt and subequal in length, 3 more slender, pointed and longer, the relative lengths being 62 : 62 and 81μ ..... *H. bidens* Bagn.

9 Manor Place, Edinburgh.

January 6th, 1928.

* An average of 12 counts.

Chrysophanus dispar batavus at Wood Walton Fen.—The Committee for the Protection of British Lepidoptera would welcome subscriptions towards meeting the expenses of the experimental colony of *Chrysophanus dispar batavus* in Wood Walton Fen.

Through the generosity of Lord Rothschild and Capt. E. B. Pulefoy the expense of mowing the terrain, planting extra docks, and flowering plants for the butterflies, etc., has been met, but the summer cutting of the reeds has to be done and the Watcher's wages have to be paid. The success of the experiment seems assured, more and more larvae are beginning to appear in spite of the almost record winter floods, and the stock hibernated in confinement is in splendid condition.

It is anticipated that, given favourable weather conditions, considerable numbers of this butterfly will be on the wing about the middle of July, and should provide a splendid spectacle.

We hope that Entomologists who are interested in this undertaking will take the opportunity of visiting the Fen about this time in order to see what has been done in the way of preparing the terrain, so as to make the establishment of this experimental colony a success. It will be necessary for intending visitors to obtain a permit from the Secretary of the Society for the Promotion of Nature Reserves, British Museum (Natural History), Cromwell Road, S.W.7. The best way of getting to Wood Walton Fen is by train to Huntingdon, and thence by car through Ramsey Heights.

Intending visitors are requested to communicate with the Hon. Sec. of the Committee for the Protection of British Lepidoptera, to whom subscriptions may be sent.—H. M. EDELSTEN, Hillside, Lindfield, Sussex: *June 4th*, 1928.

The Coleoptera of the Isle of Man.—I regret to find that an important paper on 'The Aquatic Coleoptera of the Isle of Man, with some Remarks on the Origin of the Fauna' by Frank Balfour-Browne in 'The Naturalist,' 1911, pp. 131–163, was overlooked by me in my recent note on this subject (*antea*, pp. 137–9). In this paper 47 species of water-beetles are recorded additional to the Manx Museum Catalogue, only 12 of which appear in my list.

These are as follows:—**Brychius elevatus, Haliplus confinis, H. fulvus, Noterus sparsus, Laccophilus obscurus, Bidessus minutissimus, *Coelambus inaequalis, Deronectes latus, Hydroporus pictus, *H. septentrionalis, H. lineatus, H. tristis, *H. umbrosus, H. vittula, H. incognitus, *H. erythrocephalus, H. melanarius, H. memnonius, H. obscurus, Agabus nebulosus, A. femoralis, Ilybius subaeneus, I. ater, I. obscurus, I. aenescens, Copelatus agilis, Rhantus bistriatus, Gyrinus minutus, *G. urinator, G. elongatus, *G. marinus, Hydrobius fuscipes* var. *picicrus, *Cymbiodyta ovalis, Paracymus nigroaeneus, Anacaena limbata var. ovata, *Helochares punctatus, Laccobius nigriceps, L. alutaceus, L. bipunctatus, Berosus affinis, Helophorus affinis, *Hydrochus angustatus, *Ochthebius pygmaeus, O. lejolisi, Hydraena testacea, *H. riparia, H. britteni.*

Further, *Helophorus rugosus* of the Manx Mus. Cat. should be *H. porculus* Bed.—K. G. BLAIR, 120 Sunningfields Road, Hendon, N.W. 4: *June* 1928.

Protandry in Pterostichus cristatus Dufour. This is a common beetle on Tyneside, occurring under stones on the shore and at the borders of fields, running along roads and hiding under bark and fallen trees in woods. Almost all the specimens taken in the early spring are males, and it is not until May and early June that the females become at all common. A marked example of its protandry occurred on April 2nd, 1926, when every specimen was a male out

* Spp. noted in my list.

of some 70 or 80 examples sent me by my friend, Dr. W. J. Fordham, from his garden at Gateshead.—Geo. B. Walsh, Scarborough: *June 9th*, 1928.

Corixa dentipes Th. in Cumberland.—An inspection of my series of *Corixa geoffroyi* Leach in the light of Mr. W. E. China's paper (*antea*, pp. 85–87) revealed the fact that the last specimen in the row of eight was an undoubted female of *C. dentipes* Th. It bore the label 'Thurstonfield, 25.iii.1923,' this locality being a few miles west of Carlisle, where I have taken a good many species of *Corixa*. There is a small lake there, but most of my captures have been made in small overflow pools and ditches on its margins, the main sheet of water being less productive.

On making the discovery that *C. dentipes* occurred in Cumberland I took the first opportunity of going to Thurstonfield, but owing to the recent spell of dry weather the lake was much reduced in area, and unapproachable owing to deep mud and decaying vegetation. However, I found one ditch with a little slimy, putrid water in it, and the first dip of the net brought up a large *Corixa* which an examination of the intermediate legs with a hand lens showed to be *dentipes*, male. Further work in the ditch yielded five more specimens, all females however. (This preponderance of females over males I have frequently remarked in other species of the genus.) It was noteworthy that *C. geoffroyi* was entirely absent, and it may be that two species do not occur together.

The little series of six specimens, when set and compared with *geoffroyi*, certainly have a different look, *dentipes* being much darker, almost black in fact with the pale lines very obscure. The legs, at least the intermediate and posterior pairs, are also a little darker, while of course the character of the intermediate legs, so well figured in China's paper, is unmistakeable.—F. H. Day, 26 Currock Road, Carlisle: *May 17th*, 1928.

Corixa dentipes Thoms. in Norfolk.—On returning from an all too brief week on the Norfolk Broads and looking over my captures of water-bugs, I found that two specimens of what I thought to be *C. geoffroyi* Leach were obviously *C. dentipes* Thoms. The distinguishing features of the tibial-femoral joint of the intermediate pair of legs, as shown by Mr. W. E. China, at once are obvious and can be seen almost with the naked eye. The male and female captured by me were taken on May 30th, 1928, from the drainage ditch within the dyke bordering the River Thurne about half-way between Potter Heigham and the junction of that river with the River Bure.

As a newcomer to that part of the country, I was much interested in the drainage system on the Broads, which briefly is as follows:—The river-banks connecting the various Broads have been piled up by a dredger, which I saw at work scooping up mud, slime, reeds and vegetable refuse from close in shore and then dumping its load on to the bank or dyke. Inland from this dyke lie the fields, but they are invariably separated from one another and from the dyke by a drainage ditch of varying width, depth, and vegetation. At frequent intervals the level of these ditches is regulated by pumping windmills. These ditches are a teeming mass of insect life.

In Hickling Broad I took four *Corixa coleoptrata* F., while at the spot on the Thurne referred to above I took *C. fossarum* Leach in large numbers, this species appearing in the net at each of my few attempts. *C. panzeri* Fieb. was turned up in company with *Naucoris cimicoides* L. from the River Yare above Reedham where a stream, the Chet, joins it. *C. sahlbergi* Fieb. was occasionally seen with *C. striata* L., while the River Thurne also gave me a single *C. bonsdorffi* Sahlb. The River Ant, leading from Barton Broad to the River Bure gave me another *N. cimicoides* L.

The above captures represent odd half-hours snatched while halts were made for lunch and tea, and the results cause one to regret many lost opportunities and prove once again that social demands and Entomology do not mix well.—H. R. P. COLLETT, 8 St. John Street, Deansgate, Manchester: *June 7th*, 1928.

Society

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, April 4th*, 1928.—Mr. J. E. COLLIN, President, in the Chair.

The death of the Rev. Canon E. Grose Hodge, a Fellow of the Society, was announced.

The following were elected Fellows of the Society:—Miss D. Aubertin, M.Sc., Dept. of Entomology, British Museum (Natural History), Cromwell Road, S.W.7; John W. Evans, The Cawthron Institute, Nelson, New Zealand; Rev. L. W. Grensted, M.A., B.D., University College, Oxford.

Dr. P. A. Buxton exhibited living dried eggs of the yellow fever mosquito (*Aedes argenteus*), the larvae from which emerged during the course of the meeting. The Secretary, on behalf of Mr. G. J. Arrow, exhibited some remarkable calcareous insect puparia from Australia which had probably been formed by the large weevil *Leptops duponti*. The Secretary read a letter from Professor T. D. A. Cockerell giving an interesting account of his experiences while insect collecting in Siam. Mr. F. W. Richards exhibited a Chironomid, *Telmatogeton sanctipauli* Schin., recently received at the British Museum from Cape Town. The President exhibited and made remarks upon a cabinet drawer containing his collection of British Borboridae.

Wednesday, May 2nd, 1928.—Mr. J. E. COLLIN, President, in the Chair.

The death of Mr. C. C. Gowdey, a Fellow of the Society, was announced.

Mr. Donisthorpe exhibited and made remarks on a number of specimens of the rare Syrphid, *Pocota apiformis*, Schr., bred from larvae obtained in an ash tree in Windsor Forest. Professor E. B. Poulton, F.R.S., exhibited and made remarks upon:—(1) Butterflies from Java bearing evidence of attacks by birds or lizards; (2) A Malayan dragonfly taken in the act of devouring a butterfly, *Neptis hylas* L.; (3) An observation on the conditions preceding the pairing of *Saturnia carpini* Schiff.; (4) A male bee, *Anthidium septemdentatum* Latr., bearing on its head the pollina from two orchids of the genus *Serapias*; (5) The epigamic display of a male dragonfly, *Libellago caligata* Selys. Major R. W. G. Hingston showed a lantern slide to demonstrate the various stages of a mimetic Indian grasshopper. Mr. G. Talbot gave an account, with lantern illustrations, of an entomological journey through the Great Atlas of Morocco.—S. A. NEAVE, *Hon. Sec.*

OBSERVATIONS AND RECORDS FOR SOME THYSANOPTERA FROM GREAT BRITAIN. II. SOME *OXYTHRIPS*.

BY GUY D. MORISON, PH.D. (LOND.).

Hood (Entomologist 58, pp. 132-133, 1925) has stated that *Physothrips* Karny, 1912, is a synonym of *Oxythrips* Uzel, 1895, providing that the genotypes are congeneric. However, this is not so. Priesner (Die Thysanopteren Europas I, II) does not reply to Hood, but a perusal of his synonymic lists will show why the names are not synonyms. However, Priesner includes *Physothrips* Karny

in *Taeniothrips* Amyot et Serville. I believe that Bagnall is about to reply fully to Hood.

Oxythrips halidayi Bagn.

I found females commonly on *Fraxinus excelsior* during May July, 1924, in various districts of Aberdeenshire. They occurred in the leaf buds—2-6 ♀ ♀ per bud, or, when the leaves were open, on the undersurface of the leaves usually in the angles between the secondary veins and the main vein. As seen in the body of the female the mature egg is elongated, somewhat reniform and equally rounded at both ends. Apparently 2-3 eggs mature at the same time, and the others eggs visible in the ovarioles are very few in numbers and much less developed. The mature egg measures about 270 : 90μ with a shell 3-4μ thick.

Oxythrips ulmifoliorum Hal.

During May-August, 1924-1927, in various localities of Aberdeenshire I found females commonly on *Ulmus montana* and once on *Fraxinus excelsior*. They occurred on the undersurface of the leaves, usually in the angles between the veins. It is almost impossible to dislodge them by beating the twig, and they are very difficult to pick off the leaf because of their powers of prehension aided by the sheltering leaf hairs. In my specimens three pairs of postocular hairs are clearly visible and urotergum ix bears a pair of long dorsal hairs and an arrangement of hairs like that of *ajugae*. Pale yellow nymphs which were found on the undersurfaces of elm leaves during July-August may have been this species. As seen in the body of the female, the egg is elongated, somewhat reniform with both its ends equally rounded. It measures about 240 : 96μ with a shell 3μ thick. Two to three eggs seem to mature simultaneously and greatly in advance of the others, which are few in numbers as seen in the ovarioles even of young females.

Oxythrips virginalis Priesner.

One female found on *Ribes sanguineum* at Craibstone Experimental Farm, Aberdeenshire, on 25th May, 1924. The specimen measures about 1 mm. and accords very well with what Bagnall says of his specimens (Ent. Mo. Mag. lxii, p. 282). The differences between my specimen of this species and some females of *quercicola* Bagn. lie almost entirely in the coloration and chaetotaxy of the fore wings, and in the darker brown colouring of abdominal segments 9 and 10 in *virginalis*.

Oxythrips flavus, sp. nov.

Female (fig. 1). General body colour concolorous orange yellow with a slightly brownish tinge which is darkest on the 9th abdominal segment.

Antennal segment I yellow, II darker brownish yellow, III darker yellowish brown, IV–VIII concolorous brown, except that IV and V are paler at their pedicels. Eyes almost black. Ocelli with bright red pigment. Mouth-cone and ends of tarsi tipped with brown. Legs yellowish brown, slightly paler than the body. Fore wing uniform pale yellow brown, with darker hairs; the radial vein is very faintly, the cubital more darkly, marked. Hind wing very pale yellowish-brown, with a slightly darker longitudinal vein. Hairs and ovipositor same colour as body.

Measurements in μ: Antennal segments, length : width, I 21 : 29, II 38 : 26, III 44 : 20, IV 41 : 20, V 35 : 20, VI 47 : 20, VII 8·5 : 8·5, VIII 17 : 6; total length of antennae about 258; head, length 116, width 153; length : width, maxillary palp segments I 26 : 10, II 14 : 6, III 18 : 4, labial palp segments I 3 : 5, II 20 : 3. Pronotum, length 145, width 190; long hair at each posterior angle of pronotum, length 72; mesothorax, width 260; pterothorax, length 230. Hook on fore tarsus, length 23. Tibia I, II, III, length : width 107 : 41, 100 : 38, 130 : 35. Fore wing, length 780, width at base across alula 92, at middle 42. Hind wing, length 690, width in middle 40. Length : width, abdominal segment IX 60 : 130, X 63 : 63, anterior pair of spines on IX about 18 : 4, posterior pair of spines about 9 : 2·5, longest hairs on IX, length about 87, on X about 44. Ovipositor, length 174. Abdomen, length 700, width 300. Total length of insect about 1200.

Head with cheeks slightly wider at base than behind eyes. Each eye projecting only very slightly, with inner angle rounded and moderate sized facets and about 10 hairs. Anterior ocellus about ⅓ the size of each lateral ocellus and placed closer to them than they are to one another. The ocellar pigment forms crescents towards the centre of the ocellar triangle. Mouth-cone about as long as head. Interocellar hairs strong, but the two pairs of anteocellar and the four pairs of post-ocular are most delicate. The ventral surface of the head bears five pairs of hairs. A few delicate transverse striae lie on the dorsal surface of the head behind the eyes, and similar but less conspicuous striae occur on the dorsal sclerites of the thorax.

Antennae 8-segmented, inserted in front below the vertex of the head and closely approximated. Segments: I almost rectangular, but wider at base; II barrel-shaped, but more constricted at base which has a short annulus; III with a short distinct pedicel on which is balanced the narrow end of the oval body of the segment; IV ellipsoid with a short pedicel; V oval with a short pedicel; VI ellipsoid with base broad and sides converging into those of VII–VIII. I bears 4 hairs, II 7 hairs, III 5 hairs and a forked trichome on its dorsal surface, a short sense cone on the outer lateral surface, and 5 hairs past the middle, V 2 short sense cones towards the sides near the apex and 6 hairs, VI with 1 long and 2 short sense cones and 7 long hairs, VII 4 long hairs, VIII 6 long hairs. III–VI bears each 3–4 transverse rings of microtrichia.

Pronotum almost rectangular with its points rounded. Numerous small hairs on its disc, 1 long hair at each posterior angle and a row of 8 hairs along the posterior margin, and of these the innermost are the longest. Meso- and meta-thorax apparently of normal structure.

Legs: fore tarsus with a sharp claw apparently on the outer side. A similar, but smaller, claw seems present on the other tarsi. All segments bear a number of small hairs. In the hind leg the tibia bears 2 strong spines at its apex and another on its outer lateral surface near the apex, whilst the first tarsal segment bears 2 and the second 3 strong spines.

Fore wing: costa 28 short, 22 longer, more slender hairs; radial vein 1+3+3 hairs before and 3 at equal distances after the fork; cubital vein 4+3+2; anal vein 5 hairs; 1 hair near the base and 2 special hairs near the tip of the alula; posterior fringe of 60 hairs. Hind wing, anterior fringe 24,

posterior fringe 47 hairs. Near the base there are 1 anterior, 2 median and 2 posterior special hairs. The longest posterior fringing hairs of fore and hind wings are waved. The wings are covered with longitudinal rows of microtrichia.

Abdomen: elongate oval with broad base and blunt apex. Tergum I bears 2 hairs, each of terga II–VIII bears a mid transverse row of 4 hairs, and there are other hairs at the sides. Tergum IX bears some short hairs, a long curved hair on either side near the posterior margin, a shorter hair ventrad and caudad to this, and 2 pairs of articulated, strong straight spines close to the middle line and somewhat caudad. The anterior pair of spines is longer and stouter than the posterior. The 10th segment apparently is not split dorsally. It is almost square in outline with its sides converging very slightly towards the apex. It bears 6 pairs of hairs round its posterior margin and 2 pairs at about the middle. All its hairs are short and very slender. A pair of structures like the alveoli of hairs is present on the metascutum. At least one pair of similar structures is present on each of uroterga I–IX. Spiracles as usual on meso- and meta-thorax and abdominal segments I and VIII.

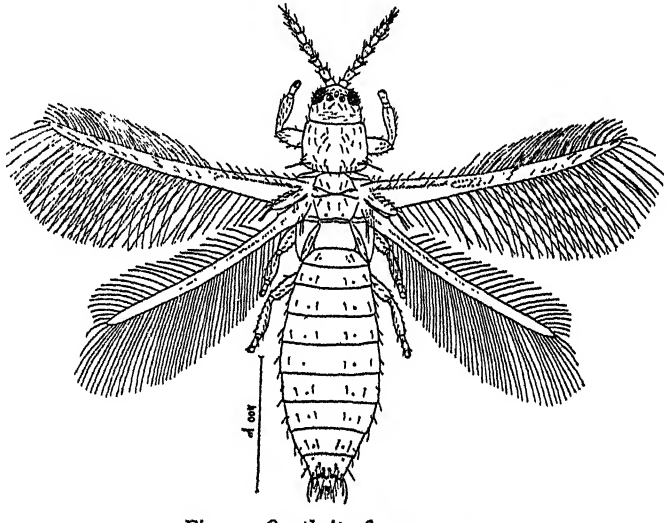


Fig. 1. *Oxythrips flavus*, sp. n.

Aberdeenshire, Garlogie, one female on *Pinus sylvestris*, 26.vi.1927. Type deposited in British Museum (Nat. Hist.). Unfortunately the specimen was damaged after mounting when a number of slides became fastened to one another. It has lost the right fore leg and the greater portion of the wings of the right side. It is ovigerous and bears at least two large eggs, each about 230 : 116 μ in size. It occurred with numbers of males and females and nymphs of both stadia of *O. ajugae* var. *bicolor* Uzel and *O. brevistylis* Tryb.

The species comes near *ajugae*, but is easily separated by its colour and the structure of the ninth and tenth abdominal segments.

In the spines of the ninth urotergum it is particularly interesting, since this is a character of the males of the genus whch has not been found hitherto in females. With the female there occurred three males which I believe belong to her species, but I hesitate to describe them till more specimens are found. The reason for my hesitation is that they do not possess any extrusible portions of the genitalia, and yet the terminal abdominal segments do not seem to have been ruptured as might be expected if the hard chitinous genital organs common in the genus were pulled out. The males seem not to belong to either *pernicis* Bagn. or the American species *divisus* Hood.

Probably all morphological characters will have to be considered in the classification of the *Oxythrips*-complex, as where either males or females of one species have characters peculiar to the opposite sex of another species. The chief specific characters for the males seem to lie in (1) claws of front and probably other tarsi, (2) shape and size of spines on urotergum ix, (3) length of longest hairs on pronotum and urotergum ix, (4) shape, size and distribution of thinly chitinised areas of the urosterna, (5) shape and size of the extrusible portions of the genitalia.

Oxythrips quercicola Bagn.

I am indebted to Mr. Bagnall for verifying my classification of the females of this species. I found 11 females and 124 nymphs of both stadia on *Quercus Robur* near Skene, Aberdeenshire, during the 4th and 11th July, 1926, and 2 nymphs instar ii on oak near Banchory, Kincardineshire, during 3rd July, 1927. The insects were captured by beating the lower branches of oak trees over a Bignell tray. The small yellow nymphs and the orange-coloured females were easily seen against the dark cloth. Though the nymphs of the second instar were comparatively numerous during 11.7.26, they were not full grown, but when I beat the same trees on 31.7.26 not a specimen was to be found, and certainly a number remained on the branches after my previous beating of them. Apparently the species is univoltine with the nymphs passing to the earth for their transformation to the adult stage.

The female in general structure is very similar to *ajugae*, but may be distinguished by lacking the claw on the fore and other tarsi. The apex of the tenth abdominal segment and the long hairs on the ninth and tenth segments are dark brown. The mature egg as seen in the body of the female measures 230 : 100μ is somewhat reniform, equally rounded at both ends.

There being no record of the nymphs in previous literature, I

append the following description of both instars which will be compared with the corresponding instars of the hitherto undescribed nymphs of *ajugae* and *brevistylis*.

Nymph I (fig. 2). General body colour pale orange-yellow, head paler, 9th and 10th abdominal segments paler and suffused with pale grey. Antennae pale yellowish grey with segments V–VII concolorous and slightly darker than the rest. Legs pale yellowish grey, slightly paler than the basal segments of the antennae. Eyes dark red. Mouth stylets and tarsal claws brownish yellow. Hairs colourless or pale yellowish grey.

Measurements in μ: Length : width, antennal segments, I 13 : 23, II 20 : 20, III 26 : 26, IV 36 : 26, V 7 : 18, VI 11 : 10, VII 17 : 7; head 70–72 : 70–72; maxillary palp segments, I 8 : 7, II 14 : 6, III 11 : 3; labial palp segments, I 2 : 3, II 12 : 2; pronotum 72–78 : 116–127, mesonotum 52–64 : 145, metanotum 35–52 : 145; abdomen about 205–290 : 145. Longest hairs on 9th abdominal segment, length 50, on 10th 40. Total length of antenna about 135, of body 305–550.

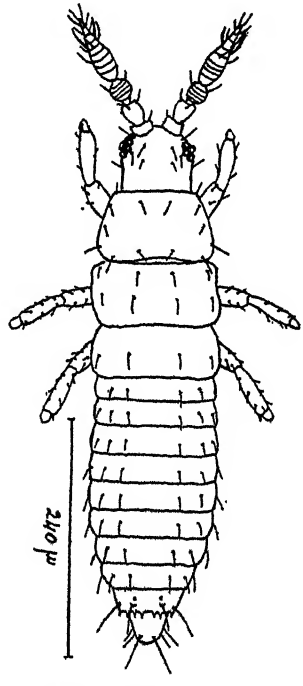


Fig. 2. *Oxythrips quercicola* Bagn. Nymph I.

Head almost square, with 1 pair of hairs in front of the eyes, 3 pairs between the eyes, another pair behind them at the sides of the head, and 3 pairs on the ventral surface. Eyes with 4 facets. Mouth-cone about $\frac{2}{3}$ as long as head, reaching to the base of fore coxae, and rounded at the apex; maxillary palps 3-segmented, with 4 hairs on the terminal segment; labial palps 2-segmented, with 3 hairs on the 2nd segment.

Antennal segments: I broader than long; II barrel-shaped, somewhat constricted at base; III with a short, very narrow pedicel from which the sides

curve outwards abruptly; IV fusiform with a broad base and with the sides tapering gradually into those of V, VI, VII. The divisions between IV–VII are very delicate, but the last three segments are slightly darker than the apex of IV. Segment I bears 1 hair, II 4 hairs, III 4 hairs and a ventral sense cone, IV 3 hairs and 1 long cone-like hair on the inner margin near the apex, V 3 hairs and 1 cone-like hair on the outer margin near the base, VI 2 hairs, VII 4 hairs. Segments III–IV are marked respectively with 4 and 5 transverse rings, which in IV are ornamented with many very delicate hair-like processes.

Pro-, meso-, and meta-notum with a shape and chaetotaxy as depicted (fig. 2). The middle coxae are more widely separated from one another than are the fore and hind coxae, between which the distances are about equal. Each coxa bears at least 1 stiff hair. The legs bear a few delicate hairs and each tarsus has a pair of very minute claws.

The first abdominal segment bears a mid-dorsal, transverse row of 4 hairs, whilst each of segments II–VIII carries a similar row of 6 hairs. The dorsal surfaces of these segments and of the meso- and meta-thorax, bear transverse rows of very minute, wart-like, integumental processes. Segment IX bears 2 inner and 2 longer outer hairs on its dorsal surface, and a row of 8 teeth along its posterior dorsal margin. Segment X bears 4 pairs of hairs of which the innermost on the dorsal surface is the longest. The longest pair of hairs on segments IX and X are slightly clavate at the tip. The mesothoracic spiracle is marked by a large area, and the spiracles of abdominal segments II and VIII are normal.

Described from two specimens found on *Quercus Robur* near Skene, Aberdeenshire, on 11.7.1926.

Nymph II (figs. 3, 4, 5). General body colour pale orange yellow, or darker brownish orange, or, more rarely, very pale yellow. The head and abdominal segments IX, X may be paler than the body. A diffused, pale grey area is sometimes seen at the anterior of the head between the bases of the antennae. Antennae darker than legs, yellowish grey, with segment I paler, V very slightly, and VI, VII considerably, darker than the rest. Eyes dark red. Mouth stylets and tarsal claws brownish yellow. Maxillary and labial palps very pale grey. Legs usually paler than body, yellowish grey or grey, with a diffused ring of darker grey towards the base of each segment. Hairs colourless or pale brownish yellow, except the pair of bright brownish yellow spines on each of abdominal segments IX and X.

Measurements in μ: Length : width, antennal segments, I 17 : 23, II 26 : 20, III 40 : 23, IV 43 : 20, V 6 : 17, VI 9 : 11, VII 17 : 7; head 75–87 : 75–81; maxillary palp segments, I 7 : 9, II 5 : 7, III 5 : 6, IV 15 : 4; labial palp segments, I 2 : 5, II 14 : 3; pronotum 93–95 : 145–159; mesonotum 63–72 : 200–217; metanotum 63–72 : 220–232; abdomen about 460 : 238; length (including portion burried in socket) : diameter (just above socket) of spines on abdominal segment IX 18 : 4, on X 26 : 6; longest hairs on abdominal segment IX, length 43, on X 30. Total length of antenna about 160, of body about 768–780. The full-grown nymph will certainly be much larger than the dimensions given above.

The second instar nymph is very like the first instar, only larger, with various morphological changes and the above-mentioned colour differences. Antennal segment II more elongate, III oval with the narrow end drawn into a short, very narrow pedicel, IV fusiform, with a distinct narrow pedicel and a broad apex, VI bears a long sensory hair on its outer lateral surface. The maxillary palp (fig. 4) is apparently 4-segmented. The pronotum bears 7 pairs of hairs, the mesonotum 6 and the metanotum 5 pairs. Prosternum is hairless,

meso- and meta-sternum each with 2 pairs of hairs. Each coxa bears 2–3 stiff hairs, and the tarsi end in two small claws (fig. 5). The integument and the dorsal chaetotaxy of abdominal segments I–VIII is like that of the first instar. Urosternum I is hairless, II has 1 pair of hairs, III–VIII each bears a mid transverse row of 6 hairs. Abdominal segment IX has its posterior dorsal margin marked by an entire, smooth, strap-like zone which starts just behind the dorsal spines. The zone is apparently almost colourless. The segment bears a pair of strong yellow spines curving upwards and backwards, pointed at the tips, circular in transverse section, and set in sockets on the dorsal surface but separated by a short distance from the middle line. It carries 3 pairs of lateral and 1 pair of ventral hairs. Segment X bears a pair of strong yellow spines curving upwards and forwards, pointed at the tips, circular in transverse section, and set in sockets separated by a short distance from the middle line on the dorsal surface. It also bears 2 pairs of lateral and 1 pair of ventral hairs. Each of segments IX and X bears a pair of structures like the alveoli of hairs on the dorsal surface in front of the transverse line of hairs. The vestigial XI segment bears 2 pairs of hairs.

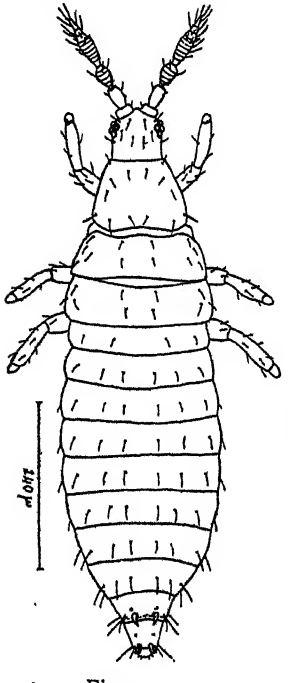


Fig. 3.

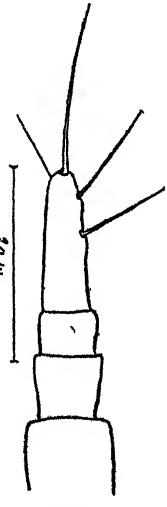


Fig. 4.

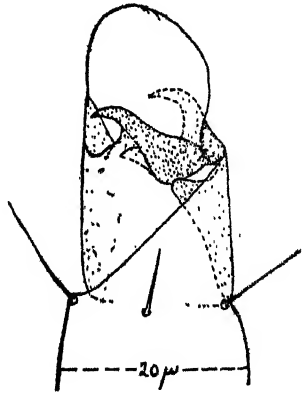


Fig. 5.

Oxythrips quercicola Bagn. Nymph II.

Described from numerous specimens found on *Quercus Robur* near Skene, Aberdeenshire, on 4th and 11th July, 1926. The two type specimens of the first instar and numerous specimens of the second instar have been deposited in the British Museum (Nat. Hist.).

Oxythrips ajugae var. *bicolor* Uzel.

Imagines were were found on 3.6.1923 at Burnham Beeches, Bucks, and during May-July, 1924,1927, in various localities in Aberdeenshire and Kincardineshire. In N.E. Scotland both sexes are often abundant with all stages of nymphs on *Pinus sylvestris* when the male cones are shedding pollen. Shortly before the male cones open, the adult thrips occur in great numbers on the undergrowth of pine woods. As the cones open they are invaded for breeding purposes by the crowd of insects, of which only stragglers now occur on other plants. During early June nymphs of the first instar are commonest amongst the cones; later nymphs of the second instar appear and predominate in numbers. During early July the numbers of adults on the pine branches becomes gradually reduced till none is left, whilst hundreds of orange-coloured nymphs of the second instar occur on the most succulent and sheltered parts of leaves and cones. By August the species has disappeared from the pine and other vegetation. It seems to be univoltine. Apparently the nymphs drop to the ground to complete their life-history. I do not know if they become imagines before winter, but most of the individuals seen in early May are young; however, Williams has found imagines hibernating in England. Besides pine, *Betula alba* is a host plant for a few nymphs, but I do not know if other plants will serve, though they are sometimes peppered with young nymphs which have been blown from their host pine by the strong winds often experienced in N.E. Scotland. I have found imagines on seventeen different species of plants, but this list could easily be extended by further search. Commonly associated with this species on pine are *O. brevistylis*, various Aphids and Arachnida and few Coccinellids, Hemerobiids and Syrphids. The nymphs may imbibe a certain amount of chlorophyll with their food, but no recognisable damage seems done to pine.

A certain amount of individual variation in colour occurs and is most marked in females, but the type *ajugae* Uzel is rare in N.E. Scotland. Various malformations of the antennae are not infrequent. Amongst other specimens I have deposited in the British Museum a male in which both antennal styles are 1-segmented.

As seen within the body of the female, the mature egg is elongated, somewhat reniform with both its ends equally rounded. It measures 290 : 96 μ with a shell 3-4 μ thick. Two or three eggs mature together much in advance of the rest, which are few in numbers as seen in the ovarioles even of young females.

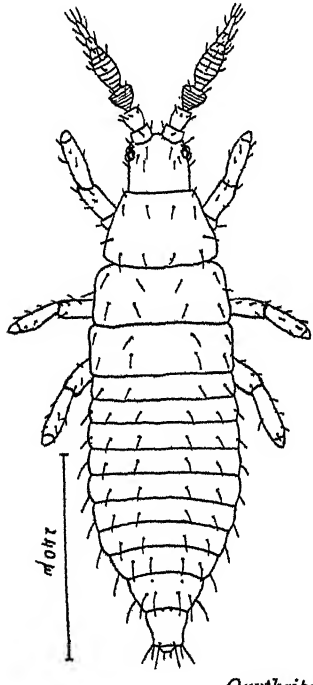
Nymph I (fig. 6). General body colour very pale yellow or light orange yellow. Antennal segment I concolorous with head, II very slightly darker

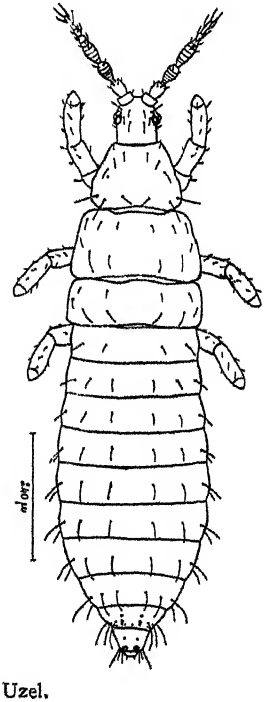
greyish yellow, III pale yellowish grey, usually the darkest segment of the antenna, IV–VII concolorous, pale yellowish grey, with the apex of IV lighter than the rest. Eyes bright crimson with or without a brownish tinge. Legs concolorous with body, or paler, and with pale grey band near the base of each segment. Mouth stylets and tarsal claws brownish yellow. Abdominal segment X yellowish grey towards apex. Hairs very pale yellowish grey.

Measurements in μ: Length : width, antennal segments I 11 : 23, II 24 : 20, III 29 : 29, IV 40 : 23, V 9 : 17, VI 12 : 12, VII 20 : 9; head 63 : 72; maxillary palp segments, I 6 : 8, II 12 : 11, III 9 : 5; labial palp segments, I 4 : 6, II 12 : 3; pronotum 92 : 140; mesonotum 72 : 145; metanotum 70 : 150; abdomen 320 : 174. Longest hairs on 9th abdominal segment, length 21–29, on 10th 29–35. Total length of antennae 160, of body 600. Observed variation in length, 570–720.

Morphology very similar to that of nymph I of *quercicola*. The metanotum bears 2 transverse rows of 4 hairs; each coxa has 3 stiff hairs, and each tarsus 2 claws; the posterior dorsal margin of abdominal segment IX is entire, or is drawn into only 2 very minute processes; the longest hairs of abdominal segments IX and X are not clavate at the tip; the innermost long hairs of X are directed sharply upwards.

Described from numerous specimens found on *Pinus sylvestris* in various localities of Aberdeenshire and Kincardineshire.





Oxythrips ajugae Uzel.

Fig. 6. Nymph I.

Fig. 7. Nymph II.

Nymph II (fig. 7). General body colour usually pale orange yellow with a brown tinge, but some specimens are very pale greyish yellow, others are dark brownish orange, and some are more or less brightly suffused with pink. The head and abdominal segment x may be slightly paler than the rest of the body. The antennae, an area at the anterior of the head between the bases of the antennae, the back of the mouth-cone, the maxillary and labial palps and the legs, are all almost concolorous yellowish grey, paler than the body. The grey is darkest on the toughest chitin of antennal segments III–VII, and as a diffused ring near the base of each of the segments of the legs. Eyes dark reddish brown, or bright red. Mouth stylets, tarsal claws, and the pair of spines on each of abdominal segments IX and X, are bright brownish yellow. Hairs very pale yellowish grey.

Measurements in μ: Length : width, antennal segments, I 18 : 29, II 29 : 23, III 44 : 23, IV 44 : 23, V 14 : 12, VI 15 : 12, VII 23 : 9; head 90 : 78; maxillary palp segments, I 11 : 10, II 9 : 7, III 6 : 6, IV 15 : 4; labial palp segments I 4 : 4, II 15 : 3; pronotum 108 : 168; mesonotum 142 : 240; metanotum 90 : 26; abdomen 620 : 288. Longest hairs on 9th abdominal segment, length 35–58, on 10th 23–52. Spines on 9th abdominal segment 15 : 4, on 10th 32 : 9 (measured as for *quercicola*). Total length of antenna 178, of body 1050. Observed variation in length, 800–1380.

Morphology like that of nymph II of *quercicola* from which it differs in its somewhat longer hairs, and in a greater contrast in the comparative sizes of the spines on abdominal segments IX and X.

Described from numerous specimens found on *Pinus sylvestris* in Aberdeenshire and Kincardineshire. About twenty type specimens of instar I and thirty of II have been deposited in the British Museum (Nat. Hist.).

Oxythrips brevistylis Tryb.

Males, females and nymphs were found quite commonly on *Pinus sylvestris* during May to early July, 1924-1927, in various localities of Aberdeenshire and Kincardineshire. Imagines were also found on grass, *Anemone Nemorosa, Menyanthes trifoliata, Ribes sanguineum, Prunus Padus, Luzula sylvestris* and *Larix europea*. Amongst other specimens I have deposited in the British Museum a male in which each antenna bears a 1-segmented style. As seen within the body of the female, the egg is elongated, somewhat reniform, with both ends equally rounded. It measures about 330 : 105μ, with a shell about 2μ thick, except at the ends, where it seems about 6μ thick. Two or three eggs seem to mature together in much advance of the rest. Besides the almost mature eggs, about twenty much smaller eggs may often be seen in the ovarioles, whilst young females show about sixty eggs in the ovarioles.

Nymph I. General body colour pale yellow densely suffused with pink. The abdomen tends to be brighter pink than the head and thorax. Antennae and legs pale greyish yellow, lighter coloured than body; third antennal segment

usually darkest. Eyes bright red or dark reddish brown. Mouth stylets and tarsal claws brownish yellow. Hairs almost colourless. Abdominal segment X unicolorous.

Size and morphology like that of nymph I of *ajugae*; abdominal segment IX not dentate caudad.

Described from numerous specimens found on *Pinus sylvestris* in Aberdeenshire and Kincardineshire.

Nymph II (fig. 8). General body colour usually pale yellow densely suffused with pink, but some specimens are almost uniform brownish yellow. Head, pronotum and abdominal segment X usually paler pink than rest of body. Antennae and legs pale greyish yellow, paler than body and almost concolorous. Antennal segment I very pale greyish yellow, II darker yellow, III–VII greyish. Maxillary and labial palps very pale grey. Mouth stylets, tarsal claws, a portion of the posterior margin of urotergum IX, and the spines on uroterga IX and X, are bright brownish yellow.

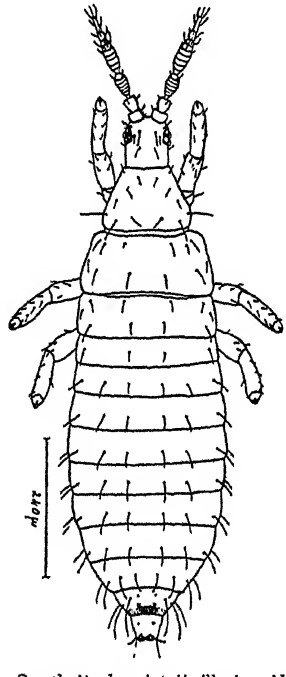


Fig. 8. *Oxythrips brevistylis* Tryb., Nymph II.

Size and morphology like that of nymph II of *ajugae*, except that the posterior margin of urotergum IX is more densely chitinised and coloured, becoming a bright brownish yellow area just caudad to the spines. Each spine on urotergum IX is small, 10 : 3μ, almost straight, pointed at the tip, circular in transverse section and lying in a socket at a short distance from the mid dorsal line. The pair of spines at the dorsal end of abdominal segment X is

placed in contiguous sockets. Each spine is produced upwards and forwards. It is pointed at the tip, but is antero-posteriorly flattened so as to appear narrowest in side view. Measured as for *quercicola*, its length is 27μ, its diameters just above the socket, 6 : 10μ

Described from numerous specimens found on *Pinus sylvestris* in Aberdeenshire and Kincardineshire. About twelve type specimens of instar I and ten of II have been deposited in the British Museum (Nat. Hist.).

The imagines and nymphs of *ajugae* and *brevistylis* were found together on pine. My reason for assigning the nymphs to their particular species is that they occurred in about the same relative numbers as the adults—*ajugae* adults and nymphs being most numerous. Red (including pink) hypodermal pigment may occur in both sexes of the adults of *ajugae* and *brevistylis*, but not so conspicuously as in the nymphs, particularly those of *brevistylis*.

The characters for separating the three species of nymphs of instar I are general coloration, structure of margin of urotergum ix, and colour of abdominal segment x; whilst those for instar II are general coloration, colour of legs, structure of margin of urotergum ix, position, shape and proportionate sizes of spines on abdominal segments ix and x.

EXPLANATION OF FIGURES.

Fig. 1. *Oxythrips flavus*, sp. n. ♀.
Fig. 2. *Oxythrips quercicola* Bagn. Nymph I.
Fig. 3. *Oxythrips quercicola* Bagn. Nymph II.
Fig. 4. *Oxythrips quercicola* Bagn. Nymph II. Maxillary palp.
Fig. 5. *Oxythrips quercicola* Bagn. Nymph II. Antero-lateral view of tarsus and the end of the tibia of hind leg. The tarsal claws are shown, and between them the bladder.
Fig. 6. *Oxythrips ajugae* Uzel. Nymph I.
Fig. 7. *Oxythrips ajugae* Uzel. Nymph II.
Fig. 8. *Oxythrips brevistylis* Tryb. Nymph II.

Department of Advisory Entomology,
Marischal College, Aberdeen, N.B.
February 1928.

Staphylinus fulvipes Scop. in the Cardiff district.—Two examples of this rare beetle occurred at Castell Coch near Cardiff, running on a path through the woods, on May 28th last, and a further addition to the Glamorgan list, which is now closely approaching the 2,000 mark, was a single *Carabus monilis* F. *Pyrochroa coccinea* L. also occurred there on the same day. The published list of the Glamorgan Coleoptera shows that Tomlin found this district a rich one when he was resident near Cardiff in the 'nineties,' and it is good to find it still producing surprises.—H. M. HALLETT, 64 Westbourne Road, Penarth: July 3rd, 1928.

TINEINA IN THE OXFORD DISTRICT.

BY E. G. R. WATERS, M.A., F.E.S.

(*Continued from Vol. LXIII, p.* 102.)

Mr. Meyrick's revised edition of his 'Handbook' furnishes the British Micro-lepidopterist with a stable basis of classification, and is likely to remain for a long time the standard work on our smaller moths. From this point onwards, therefore, I shall follow its divisions and nomenclature as closely as possible.

VIII. HYPONOMEUTIDAE.

The pine-feeders *Ocnerostoma piniariella* Zell., *Cedestis farinatella* Dup. and **C. gysseleniella* Dup. are all fairly common among scattered pines at Tubney. Both species occur also in plantations in Bagley Wood, and I have taken *gysseleniella* at Boar's Hill. *C. farinatella* has been bred in large numbers from larvae collected in March and April, mining down the needles of *Pinus sylvestris* and *P. Laricio* var. *austriaca*, or found sunning themselves externally when full-fed in May. The larva of *gysseleniella*, however, has hitherto eluded me.†

Notes on the conifer-feeding species of *Argyresthia* inhabiting the Oxford district were published in 1921 in Vol. lvii of this Magazine, p. 38. A few details can now be added. **A. atmoriella* Bnks. is apt to be troublesome on larches in Bagley Wood, at Cothill and Tubney, on the downs near Streatley, and probably in many other spots. **A. glabratella* Zell. is now of regular occurrence on spruce, being found in Bagley, Tubney and Wytham Woods, and on the Chilterns near Watlington; in all probability it is generally distributed and even common.* The larvae feed in the winter and spring, mining shoots of spruce from the tips inwards, in much the same manner as *atmoriella* attacks larch twigs, though with less conspicuous results owing to the smaller size of the species. The needles at the end of the shoot first become discoloured, and then drop off for a distance of an inch or more from the tip. This is an insect which should be carefully watched, as one which might develope into a destructive pest; at Tubney in the

* The asterisk indicates that the species may be added to the list of Berkshire Lepidoptera published in the Victoria County History (1906).

† In view of Mr. Meyrick's renewed statement (based on Stainton?) that the larva of *gysseleniella* feeds in a loose web among leaves, it is worth pointing out that an account of the habits of this species was published by J. Tragardh in Medd. nr. 53 fran Centralanst. for forsoksvasendet pa jordbruksomradet. Entomol. Afd. nr. 9, Upsala, 1911, and translated into German by K. Mitterberger, in Societas Entomologica, XL, Stuttgart, 1925, pp. 13 and 18. According to Tragardh the larva of *gysseleniella* is a leaf-miner, like *C. farinatella* and *O. piniariella*, but differs from them in that it mines from the base of the needle upwards.

* Another locality for this much overlooked species is near Wellington College in southern Berkshire.

early months of the year I have seen old spruces whose lower branches were seriously infested, while in Bagley Wood the species is well established in plantations of young trees. The juniper-feeders, *A. arceuthina* Zell., **A. praecocella* Zell., **A. aurulentella* Staint. and *A. dilectella* Zell. are all common, often abundant, on the chalk hills from Radnage (Bucks), across Oxfordshire (Chinnor and Watlington) to Streatley and Moulsford Downs (Berks). *A. dilectella* occurs also, sometimes in plenty, among planted conifers at Oxford. More local is **A. abdominalis* Zell., a particularly delicate and pretty insect, which has now, however, been captured in some numbers among junipers at Watlington and Radnage, besides one specimen from Streatley.

The British species of *Argyresthia* attached to deciduous trees have all been detected in this district, with the exception of *A. spiniella* Zell. Most of them are generally distributed and plentiful. *A. brockeella* Hübn. and *A. goedartella* Linn., which both abound among birch and alder, produce many striking varieties; both have pure golden forms (*brockeella* then being distinguished by its white thorax and earlier emergence), while *goedartella* varies in the other direction to a plain creamy white (like the common ab. *ossea* Haw. of *A. nitidella* Fabr.). *A. semifusca* Haw. is perhaps less plentiful than most of the others, but has been taken in all parts of the district. The more local species are *A. andereggiella* Dup., which was formerly recorded from Boar's Hill by Mr. N. V. Sidgwick (Berkshire list), and is not uncommon among old crab-apple trees in Bagley Wood; *A. sorbiella* Treits., which occurs among *Pyrus Aria* on the Chilterns at Watlington, but not in the near neighbourhood of Oxford; *A. conjugella* Zell., recorded only from Headington Hill, where Mr. A. W. Pickard-Cambridge finds it regularly on *Pyrus Aucuparia* in his garden; and *A. glaucinella* Zell. Of the last-mentioned only a single example has yet been found—on July 2nd, 1924, resting on the trunk of a rather isolated oak in a lane at Water Eaton.

**Zelleria hepariella* Staint. occurs rarely among ash in Bagley Wood; at Streatley, on the chalk, the moth is locally common, both before and after hibernation.

The five British species of *Swammerdamia* all occur here, and are common with the exception of *S. combinella* Hübn., which has been taken at Yarnton, Watlington and elsewhere, but has never been common in my experience and has not been seen for at least a decade. I have recently found evidence that the larva of the common *S. caesiella* Hübn. begins its career as a leaf-miner—an

unrecorded habit in this genus—and hope to go into the matter more fully another season.

Scythropia crataegella Linn. is locally plentiful in Bagley, Waterperry and Shabbington Woods, the larvae occurring gregariously on blackthorn and hawthorn.

The genera *Prays, Hyponomeuta* and *Ethmia* (*Psecadia*) have already been briefly mentioned in earlier papers (September and October, 1923). A word must be added concerning the genus *Acrolepia*, formerly treated by Mr. Meyrick as the ancestor of *Argyresthia* and *Swammerdamia*, but now transferred to the Plutellidae. The only species detected in the Oxford district is **A. pygmaeana* Haw., which is sometimes rather common in the larval stage, mining large blotches in leaves of *Solanum Dulcamara*, at Tubney and in the University Parks at Oxford. In the autumn, and in spring after hibernation (as late as May 10th) the imago may occasionally be disturbed from thatch. In this district the species seems to be habitually double-brooded, larvae found at midsummer producing moths in July, those found in September producing moths in October. *A. granitella* Treits. appears, somewhat unaccountably, to be absent from the district.

IX. Lyonetiadae.

Opostega salaciella Treits. has been captured at Kennington (Berks) and Streatley, flying in dry places on still evenings, but is doubtless much overlooked. *O. crepusculella* Zell. has been taken singly in Bagley Wood (among wood-sage), in a wet lane near Forest Hill (Oxon), and attracted to a lighted window at Oxford.

Leucoptera laburnella Staint. is a universal plague on laburnums. *L. spartifoliella* Hübn. occurs among broom on Cumnor Hurst, and near Nettlebed on the Oxfordshire Chilterns. *L. wailesella* Staint. is only to be found near Shabbington Wood, among *Genista tinctoria*, from the leaves of which it has been bred in plenty. *L. scitella* Zell., though less common than in many districts, is generally distributed; the conspicuous blackish blotches made by the larvae may be found in crab-apple leaves at Shotover, South Hinksey, Cothill and in Bagley Wood, and in hawthorn leaves at Bletchingdon, Yarnton and probably other spots along the Canal. Some empty blotches found on *Pyrus Aucuparia* in Tubney Wood, at the end of August, 1925, are also undoubtedly referable to this species.

Lyonetia clerkella Linn. is common, variable and polyphagous, the larva mining leaves of apple (wild and domestic), pear, cherry,

blackthorn (*Prunus spinosa* and *P. insititia*), hawthorn (native and introduced species), mountain ash, *Cotoneaster frigida*, and (rarely in this district) birch.

The interesting genus *Bucculatrix* is fairly well represented. **B. cristatella* Zell. is locally not uncommon, but is much overlooked owing to its smallness and obscurity; it has been taken on Cumnor Hurst, in Holton Pits, in a meadow near Forest Hill, and on the chalk at Watlington and Streatley, but in the largest numbers near Shabbington Wood. *B. nigricomella* Zell. is fairly common, and has been bred freely from larvae collected in April on ox-eye daisy. **B. frangulella* Göze is particularly plentiful at Cothill on *Rhamnus catharticus*, the leaves being often riddled with the peculiar spiral mines made by its young larvae. On the chalk specimens have been captured at Radnage and Streatley, and the larvae have been seen in plenty on *Rhamnus catharticus* at Hailey (Oxon). *Rhamnus Frangula*, which is said to be the more usual food-plant, is very rare in this district. *B. boyerella* Dup. is sometimes rather common on fences at Oxford, beneath elms; I have captured the moth at Tubney and near Shabbington Wood, and have found its mines on elm at Shotover. *B. cidarella* Zell. is fairly plentiful in one spot at Cothill on alder, the leaves of which are sometimes riddled by its mines in the same way as leaves of buckthorn by *frangulella*. *B. ulmella* Zell. has hitherto occurred very sparingly, chiefly in Waterperry Wood, and once in a small wood at Boar's Hill; an empty cocoon of this species has been found on oak in Tubney Wood. *B. crataegi* Zell. is sometimes rather common, both as imago and as larva, along hawthorn hedges near Shabbington Wood; it has also been taken in Waterperry Wood, and once at Tubney. *B. demaryella* Staint. has hitherto been detected only in Waterperry Wood, where the larvae occur rather sparingly on birch in August.

Oinophila v-flava Haw. inhabits wine-cellars at Oxford, its larva attacking the corks of wine-bottles. It has sometimes been responsible for a serious deterioration in the college port, and I have seen its work in the corks of champagne bottles at the 'Mitre.'

The genera *Bedellia* and *Tischeria*, now included in the *Lyonetiadae*, have already been dealt with under *Gracilariadae* (Ent. Mo. Mag., lxi, 1925, pp. 188*ff.*). On the other hand, mention must be made here of *Phyllocnistis*, now transferred to the *Gracilariadae*. *P. saligna* Zell. is local, occurring among willows at Godstow, Tubney and near Stanton St. John, and frequenting thatch in the

two latter localities. *P. suffusella* Zell. is everywhere common on black and Lombardy poplars. The specimens with the inner half of the forewings unmarked, which (in Ent. Mo. Mag. lxi, 1925, p. 88) I was misled into identifying with *P. tremulella* Zell. (=*sorhageniella* Lüders), are undoubtedly only a common summer form of *suffusella*, which I have now bred in good numbers. It is nevertheless permissible to hope that *tremulella*, which is mainly an aspen feeder,* may yet be detected in this country.

X. Tineidae.

This family, as now restricted, is poorly represented in the Oxford district, and can be dealt with summarily. The domestic species, though not less abundant than elsewhere, are for the most part depressingly commonplace. Along with *Tinea pellionella* Linn., *T. fuscipunctella* Haw. and *Tineola biselliella* Hüm., *Tinea pallescentella* Staint. is sometimes common in houses, and shows a preference for emerging in the winter months. A specimen of *T. misella* Zell. has been met with indoors at Oxford, as well as twice in thatch at Tubney. *T. flavescentella* Haw. has been bred freely from the remains of a dead pigeon picked up at Oxford. *T. granella* Linn. has been found in an Oxford flour-mill. *Trichophaga tapetiella* Linn. is not much in evidence, but occurs in outhouses at Cothill and Tubney. *Monopis rusticella* Hübn. is common, usually about houses, but *M. ferruginella* Hübn. has not been found nearer to Oxford than Streatley.

The commonest of the species attached to rotten wood and fungi is *Tinea cloacella* Haw., which occurs everywhere. *T. arcella* Fabr., though not very common, is widely distributed, being recorded from Kennington (Oxon), Tubney and Waterperry Wood, as well as from Highmore and Chinnor on the Chilterns. The other sylvestral *Tineae* are *T. parasitella* Hübn., common on tree-trunks in Wytham, Bagley and Tubney Woods; *T. corticella* Curt., locally rather plentiful among old oaks in Bagley Wood; and *T. fulvimitrella* Sodof., sometimes locally common in Bagley Wood, captured also in Waterperry Wood and in beech-woods near Chinnor. But the most interesting of this group is the much overlooked **Monopis weaverella* Scott, which in the woods of this district almost (but not entirely) supplants *M. rusticella*; it is captured regularly in Bagley Wood and at Cothill, and has been taken in Waterperry Wood and near Shabbington Wood. There are definitely two broods a season, the moth appearing in May and early June, and again in late July and August.

* See Mr. A. Sich's paper in Ent. Record, xxxvii, 1925, p. 97.

During the last few years Mr. A. H. Hamm has made a practice of handing over to me the lepidopterous larvae which he has met with in birds' nests, chiefly around Headington and in the University Parks. Certain common species which feed on wool, feathers, dead leaves and other rubbish have been bred from these in large numbers. *Monopis rusticella* Hübn. has been obtained from the nests of a house-sparrow, a hedge-sparrow, a blackbird, a song-thrush, a greenfinch and a great tit; *Tinea lapella* Hübn. from the nests of a house-sparrow, a hedge-sparrow, a song-thrush, a greenfinch and a spotted flycatcher. *T. pellionella* Linn. has been reared from a hedge-sparrow's nest. *Borkhausenia fuscescens* Haw., *B. pseudospretella* Staint. and *Endrosis lactella* Schiff., belonging to the *Oecophoridae*, complete the list. *Tinea semifulvella* Haw., which is widely distributed in the district (Oxford, Bagley Wood, Bladon Heath, etc.), ought also to be obtained by this method, but has not yet turned up. I take this opportunity of thanking Mr. Hamm for his enlightened co-operation.

The genus *Ochsenheimeria* is probably much overlooked owing to its unusual day-flying habits. *O. birdella* Curt. was once taken by Mr. Hamm in a bog near Cowley, and I have noticed it at North Hinksey; this species at least is likely to be well distributed in the district.

The group of species with case-bearing larvae included by Tutt under the heading Micro-Psychina is not very prominent in the Oxford district. Prolonged search for *Solenobiae* has revealed the presence of only a single colony in the neighbourhood; this is on a rough stone wall at Tubney, where the larvae are not scarce. As they have hitherto produced apterous females only, they may be assigned provisionally to the convenient but ill-defined 'species' *S. lichenella* Linn. Farther afield similar parthenogenetic colonies may be found on beech-trunks in the woods near Nettlebed. Larvae and old cases of *Talaeporia pseudobombycella* Hübn. may frequently be seen on tree-trunks in Bagley and Tubney Woods, but are most plentiful in a small area at Cothill. The only species of this group which is really common here is the apterous and parthenogenetic **Luffia ferchaultella* Steph., whose larvae may often be found in immense numbers—on field-posts at Kennington, on an open fence at Yarnton, on oak-trunks in Tubney Wood, on Lombardy poplars in the University Parks, even on an ancient tombstone in Dorchester Abbey churchyard, as well as on the lichen-covered wall of the church. In Bagley Wood the larvae are well-distributed rather than abundant, occurring on the trunks of

various trees. At Cothill they occur on grey poplar and even alder. To the east of Oxford and on the Chilterns *ferchaultella* seems to be far less common; but I have found its cases on oak in Waterperry Wood, and on beech at Stoke Row. A much rarer insect is **Luffia sepium* Spey. (the *Bacotia sepium* of Tutt), which must be well established in the Oxford district, to judge from its repeated occurrences in recent years. An active larva which I found on an oak-trunk in Bagley Wood on February 25th, 1923, produced a parasite shortly after. A case found near the same spot on February 21st, 1926, produced a moth, which escaped or was destroyed. Mr. O. W. Richards had the good fortune on June 4th, 1925, to discover nine cases of this species on some field-posts at Kennington, and bred the imagines successfully. Perhaps the most unexpected capture was that of a larva found on November 16th, 1923, in my room in Exeter College; it was walking along the kerb of the fire-place, and the only way in which I could explain its presence there was by supposing that it had been introduced with firewood. *Narycia melanella* Haw. is rather frequently met with in the larval stage—on oak-trunks in Bagley and Wytham Woods, on stone walls at Tubney, on old fences at Oxford, etc. The imago may also be found resting on fences in rainy weather. The only record of *N. marginepunctella* Steph. from the near neighbourhood of Oxford is that of a single full-fed larva found on July 13th, 1922, on a post near Yarnton. Farther afield, this insect is not uncommon in beech-woods at Stoke Row on the Chilterns.

184 Woodstock Road, Oxford.
July 21st, 1928.

AN *AGERONIA* RESPONDING TO A NOISE MADE BY BIRDS.

BY C. L. COLLENETTE, F.E.S.

On October 5th, 1927, at Burity in Matto Grosso, Central Brazil, while walking along a path in high forest, I noticed two small birds fighting together on the ground, having the appearance of warblers. I stopped to watch them at about five yards distance. When about to attack, one bird or the other frequently made a rapid clicking sound with its beak.

An *Ageronia* flew down from above and settled on the front of my coat, and on each occasion that the clicking arose from the birds the insect immediately took a short turn in the air and gave its characteristic clicking noise in reply. This happened four or five times, after which the *Ageronia* flew up into the trees again.

The sounds made by the birds and the butterfly were very similar, both in quality and speed of utterance, and the prompt response of the insect left no doubt that it was replying to the birds.

I was not able to capture the butterfly, but it appeared to be *Ageronia februa sabatia* Fruh., which was common in the locality.

For an account of the sound apparatus of the *Ageronias* and its use, see Hampson, P.Z.S., 1892, p. 190.

Gothic Lodge, Woodford Green, Essex.
July 6th, 1928.

DORCATOMA SERRA PANZ., A SPECIES OF COLEOPTERA NEW TO THE BRITISH LIST.

BY HORACE DONISTHORPE, F.Z.S.

I have recently taken this fine species of *Dorcatoma* in some numbers in Windsor Forest, and have also bred it in plenty from 'Tinder Bracket' fungus (*Fomes fomentarius* L.) from the same locality.

I hope, as soon as I am sufficiently recovered from my recent accident, to publish a further note on this beetle and its nearest allies.

Acland Home, Oxford.
July 12th, 1928.

ON SOUND PRODUCTION IN THE PSOCOPTERA AND ON A PRESUMED STRIDULATORY ORGAN.

BY J. V. PEARMAN, F.E.S.

I.

From time to time it has been claimed that certain Psocids (book-lice) can produce an audible ticking noise (the 'death watch'), and almost as often there has been expressed disbelief in their ability to create such a sound (e.g. McLachlan, E.M.M. 1867, iii, p. 181; Smith, t.c., p. 279). While entomologists are divided in opinion on the matter, confusion has been introduced into the controversy by vagaries of nomenclature, both *Liposcelis* (*Troctes, Atropos*) *divinatorius* (Mull.) and *Clothilla* (*Trogium, Atropos*) *pulsatoria* (Linn.) having been referred to, at various times, as *Atropos pulsatoria*.*

As regards the first-named, and smaller of the two, the evidence is only circumstantial—that is, search in the area whence the sound

* The generic names without the brackets appear to be those with the soundest claims to validity. Illiger's (1798) name *Trogium*, based on *Hemerobius pulsatorius* Fabr., resurrected in 1911, is open to the same objection as the other discarded names, inasmuch as Fabricius's insufficient diagnosis is followed by citations referring to both species.

has been proved to proceed has revealed the presence of the Psocid and no other living creature. From such an investigation Blackwall[1] associated a noise resembling the ticking of a watch with the insect called by him *Atropos pulsatoria*, but which McLachlan —although he does not say on what grounds—pronounced to be *A. divinatoria*. Similarly, at the Entomological Society's meeting of December 2nd, 1891,[2] Gahan reported finding *A. pulsatoria* Fabr. in boxes from which the 'death watch' had been emitted; three or four years ago, Dr. Gahan informed me, in conversation, that the insect was the small *divinatorius*. On the other hand, Hagen[3] (p. 287) failed to hear any sound from captive examples, an experience that, from the comparative scarcity of the species in the Bristol district, has been mine also. Yet, for a reason that will appear later, the balance of probability supports the evidence adduced.

It is not at all clear to which species Haller[4] refers when he says that *Troctes pulsatorius* can be seen, under the microscope, to knock with its head, and that when it strikes on cardboard (kartonpapier) a sound is audible. The size he gives, 'von $\frac{3}{4}$ Linie Grosse,' is an approximation intermediate between the lengths of *L. divinatorius* ($1\frac{1}{4}$ mm.) and *C. pulsatoria* (2 mm.).

Sound production by *Clothilla pulsatoria* (L.) has been better attested, and has been known to me for over ten years. The more important early literature was very fully reviewed by Hagen in 1883,[3] but his article, like the papers it reviews, appears to have been persistently overlooked. Recently Solowiow[5] announced that the insect taps with its abdomen and not with its head, as was formerly supposed. This fact, incredible as it may seem to sceptics, I am able to corroborate from observations made independently, many times, prior to becoming aware of those of Solowiow. The latter, using a hand lens only, was obviously restricted in the scope of his investigations; with the Greenough binocular microscope it is possible to note the insect's actions in detail, and thus to confirm the accuracy of Derham's classic observations* and to clear up certain matters previously left obscure.

When about to tap, *C. pulsatoria* assumes an attitude with the legs spread, the head and thorax raised somewhat, and the tip of the abdomen depressed so that the pre-genital sternite rests on the surface on which the insect is standing (fig. 1). This body posture is stiffly maintained throughout the performance, in which the motion is due apparently to force exerted alternately by the first

* Phil. Trans, R. Soc. 1701, xxii, p. 832; 1704, xxiv, p. 1586.

and third pairs of legs in opposition. Commencing with a quick forward jerk, the body—as a consequence of the resistance offered by the hind legs—moves through a slight arc, so that the head dips slightly and the end of the abdomen is almost imperceptibly raised. On the tension of the forelegs being relaxed, the body springs back suddenly to the initial position, causing the pre-genital sternite to strike the ground. After the preliminary pull by the forelegs there is a short pause before the first recoil, but thereafter the to-and-fro movements succeed one another without intermission.

In the case of a young and vigorous imago taps will be made at the rate of five or six a second, often for as long as a minute without cessation, and recommence after a pause of a few seconds. Older individuals often may not exceed a speed of four taps a second. In all cases the tapping ends on a slower beat. The following figures, recorded from a young female, give the duration in seconds of the alternating periods of continuous tapping and intervening pauses, the latter in brackets: 27, (22), 41, (21), 50, (22), 48, (20), 49, (25), 25, (22), 43, (17), 30, (20), 61, (17), 30, (15), 33, (5). In this manner an individual has been observed to tap for over an hour without change of station and, with varying intervals of wandering and rest, to tick for several days.

Sound production seems to be peculiar to the female. No tapping has been seen or heard where males have been confined in specially-contrived cages, whereas there has been no difficulty in demonstrating the act with captive females.

An instrument of percussion in the form of a slightly thickened knob occurs medially near the posterior margin of the pre-genital sternite of the female imago (fig. 2). From its form and situation it seems to represent the sub-genital plate of other species. It does not appear to be highly chitinised and is of the same pale colour as the adjacent delicate integument, but in stained preparations it acquires a deeper tint than the neighbouring dermal tissue. This structure is wanting in the male.

Failures in the past to verify experimentally the death-watch ticking of *C. pulsatoria* must be imputed to ignorance or disregard of Derham's account where it is emphasised that the sound was heard only when the insect tapped on paper. It seems to be a necessary condition of audibility that the material struck should be thin and resilient (vibratory), the presence of a resonant cavity or a reflecting surface tending to render the sound more distinct. It thus becomes understandable, having regard to the delicacy of

the insect, why paper yields the loudest tone, why some substances (*e.g.* cardboard, wood) give varying results, and why others (*e.g.* glass) are non-effective. A simple observation cage can be made by forming a little open-ended truncate cone of note-paper, pasting tightly-stretched tissue-paper over the smaller end and securing a cover-glass over the larger end. If a female *C. pulsatoria* be enclosed, with a little food, and the cage suspended by a thread or supported on a wire tripod, sooner or later the tapping should be heard, when its close resemblance to the ticking of a watch ('sewing machine'! p. 307, Hagen) (3) will become evident.

Another indoor Psocid, *Lepinotus inquilinus* Heyd., not hitherto suspected, also makes a tapping noise, which however differs from that of *C. pulsatoria*. Usually the sound has a likeness to a creak, such as is produced on bending stiff leather, ending with two or three distinct beats. An idea of its nature may be gained by running a finger over the points of a narrow hair-comb, starting about the middle of the fine teeth and stopping after three coarse teeth have been passed. The duration of each creak is almost uniformly three seconds, the separating noiseless intervals varying from fifteen seconds to eighty. This may be the other sound 'eine Art Triller' mentioned by Solowiow (5, p. 22). Under certain conditions the tapping more nearly resembles that of *C. pulsatoria*, but is always of short duration, and has a 'rocking' or metallic timbre. Such a sound has been produced by an insect standing on the tissue-paper bottom of a cage like that described, while the creaking noise has been heard to proceed from a cage wholly constructed of stiff rough paper, as well as from loose wall-paper where unconfined individuals were present.

In spite of prolonged vigils, it has not yet been possible to witness the operations of this species, which is more sensitive to interference than *C. pulsatoria*, but it is presumable that the tapping is performed in a manner similar to that of the last-named. There is no visible percussor in *L. inquilinus*, but the insect has an unusually firm integument, and the approximated gonopods of the eighth sternite might serve the purpose.

On the sub-genital plate of the female *L. divinatorius* is a peculiar tubular T-shaped chitinisation. It is perhaps not unreasonable to regard this as analogous to the percussor of *C. pulsatoria*, and to that extent corroborative of the evidence adduced in favour of sound production by the smaller species.

The sounds produced by all these insects are undoubtedly the mating calls of the females, and it is not unlikely that vibration is

as essential as noise. The males of *L. inquilinus* and of some related species are equipped with a brush, or group of bristles, on the eighth sternite which may well be the external parts of organs for the perception of vibrations. Nothing suggestive of analogous organs has been detected, however, in the male *C. pulsatoria*. As regards *L. divinatorius* it is not improbable that the long perpendicular bristles of the thoracic sternites (in both sexes) may be specially sensitive to vibrations when in contact with a transmitting surface.

The insects are most active in sound-production from the end of July up to October, but may occasionally be heard during the winter months.

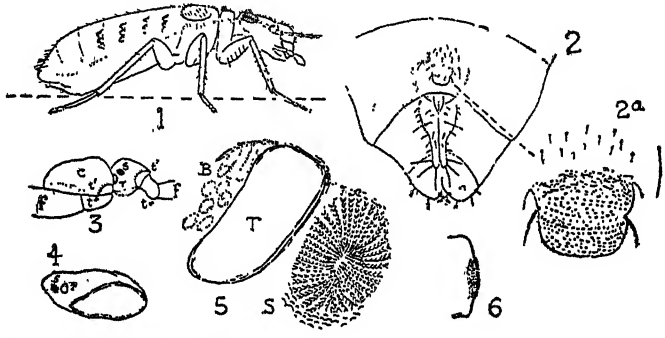


Fig. 1. *Clothilla pulsatoria* ♀, tapping attitude. 2. Same, apex of abdomen beneath; 2*a*, percussor. 3. *Mesopsocus unipunctatus* ♀, hind coxae, viewed obliquely from below. 4. *Stenopsocus immaculatus* ♂, right hind coxa, removed and viewed from above. 5. *M. unipunctatus* ♂, coxal organs (dissection flattened). 6. *Hyperetes guestfalicus* ♀, profile of inner face of left hind coxa. c=coxa; t′, t″=trochanter; f=femur; S=scaled organ; T=tympanum; B=bullae.

II.

In Psyche, iii (1882), at p. 402, is reported a statement by Dr. Hagen that all species of Atropina are furnished with sound-producing organs. No details are given and nothing appears in Hagen's monographic revision of the Atropina (3) beyond a suggestion that the sculpturing on body and femora, especially of *A. divinatoria*, could represent rasps and files suitable for sound production. On none of the three species associated with the 'death watch' rapping has any structure been discerned that could be claimed as specially developed for stridulation, but many other Psocids do possess organs on the hind coxae which might reasonably be regarded as having a stridulatory function.

As occurring in British species, the organs in their more

elaborate form comprise two separate structures (fig. 3-5). On the inner face of each hind coxa is a slightly-raised oval or rounded swelling, its surface sculptured as if imbricated with pointed or dentate scales having their free edges directed upwards and inwards. The scales radiate from a slight median depression (which sometimes appears as a clear slit-like line) and increase in size progressively as they approach the periphery (fig. 5 S). In those species having the coxal integument more heavily chitinised and darker, that part forming the scaly prominence is visibly of less dense consistency and paler—just as the walls of a rubber balloon become thinner and more transparent on inflation. Close behind the scaled structure is a tympanum or drum-like formation of rounded D-shape having a thickened (rolled) edge surrounding a delicate transparent membrane (fig. 5 T).

In the simpler forms the tympanum is wanting, only the scaly eminence being present.

There are slight variations among the genera in the proportions of the organs, in their exact situation, and in the form of the scales, but there are no essential differences in construction. Not infrequently the organs are better developed in the males, and in some species altogether absent in the females, especially when the latter are apterous.

The coxae often exhibit in addition clear, bubble-like spaces (fig. 5 B), but such spots are not peculiar to these sclerites, occurring also, for example, at the base of the maxillae. Mention may here be made of certain pore-like appearances on the trochanters, possibly indicative of sensory organs (? auditory).

It is difficult to see what purpose the coxal organs could serve unless it be that of sound production (*cf.* the coxal rasps of some Coleoptera). The hind coxae of those species possessing the organs are approximated in such fashion that the scaled structures could be rubbed together. Sounds thus generated might be inaudible to human ears, but the extraordinary volume of noise produced mechanically by many insects encourages the hope that, if a fact, it may at some time be possible to obtain auricular evidence of Psocid stridulation. It is suggested that the tympanum may act as a resonating accessory, comparable to the speculum of *Phasgonura viridissima*. Investigation of the minuter anatomy (especially the nerves) of the underlying internal parts of the coxae might help towards a more definite opinion on the function of the structures, but opportunity for this research has been lacking. Apart from the mass of muscle, the coxae house a somewhat

funnel-shaped chitinous plate to which strong muscles are attached. This has no apparent relation to the coxal organ, and is presumably connected with the insects' ability to leap.

Accepting for the present the hypothesis of sound-production, it is curious that the organs should be more largely developed in the males, whereas it is the female that is the noisy sex in those species producing sound by rapping. As a purely conjectural explanation, taking into consideration the roving habits of the 'death watch' species and the more settled gregariousness of the majority of other species, it might be reasonable to regard female tapping as a call, and male stridulation as a charm sounded only during the exciting 'courtship dance' (of which an account will be given in a subsequent communication).

It is noteworthy that the scaled organs are present in both sexes of *Hyperetes guestfalicus* Kolbe, the males of which bear a bristle tuft on the eighth abdominal sternite. It may be found hereafter that the females of this species also tap to call the males, in which case there is an implication that the simpler form of coxal organ has resulted from loss of the tympanum, and not *vice versâ*. In this connection it may be observed that the male of *Reuterella helvimacula* End. is without the tympani, and the scaled structures of this species have a large central, unsculptured, flattened area so that the single organ seems to form a combined stridulating and resonating apparatus.

Without enumerating every species examined, the following list summarises the information obtained as to the existence of coxal organs in the genera of British Psocoptera.

Complete organ (*i.e.* scaled structure + tympanum) present:—*Caecilius, Ectopsocus, Elipsocus, Graphopsocus, Mesopsocus, Peripsocus, Philotarsus, Psocus, Pterodela, Stenopsocus, Trichopsocus.*

Simple organ (*i.e.* scaled structure only) present:—*Reuterella* ♂, *Hyperetes, Pteroxanium, Psyllipsocus.*

Organ absent:—*Reuterella* ♀, *Bertkauia* ♀, *Clothilla, Lepinotus, Liposcelis, Nymphopsocus.*

Some time after detecting the psocid coxal organs I learned that the late Bruce F. Cummings, of the British Museum, had previously done some work upon them, but had not completed his researches at the time of his death. I have no knowledge of the extent of his studies, nor of any other worker having investigated these interesting features.

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Many references of lesser importance omitted.

32 Cornwallis Crescent, Clifton, Bristol.
June 1928.

Stenichnus harwoodi Williams from Berkshire.—In revising my MS. of the Scydmaenidae for my forthcoming book on British Coleoptera I find I have a specimen of this species, taken at Aldworth, Berks, in April, 1901.—NORMAN H. JOY, 78 Crescent Road, Reading: *July 14th*, 1928.

Aegeria flaviventris Staud. in the Oxford District.—This new British clear-wing, already found in Hants and Devon, proves to be a well-established inhabitant of the wooded country round Oxford. In January and February, 1928, I devoted several afternoons to searching in likely spots for larvae of *flaviventris*, and brought home some hundreds of sallow twigs containing galls and burrows of various kinds. Several dozens of these were found to agree in all particulars with the description of the swellings made by *flaviventris*, and some were seen to contain Aegeriid larvae. Many of the larvae showed their activity by thrusting quantities of frass through the exit holes (thus they were still feeding in the spring). But the number of casualties through parasites and other causes was large, and six specimens only of the imago emerged (indoors) between April 22nd and May 25th; two others were found to have died in their pupae when on the point of emergence. The burrows tenanted by *flaviventris* came from at least six different localities, in Berks, Oxon, and Bucks, within about seven miles of Oxford. In some localities (but not in others) up to eighty or ninety per cent. of the burrows had been pecked open by birds. In the locality where they were most plentiful, it was quite a usual thing to find on a single small sallow bush (always, so far as I could tell, *Salix cinerea*) half-a-dozen burrows in a circle, each neatly ripped open. It remains to be seen whether the mortality can be reduced by gathering the sticks earlier in the winter. I should like to express my thanks to Mr. Wm. Fassnidge, of Southampton, for his kindness in sending me some excellent photographs, which made it easy to recognize the work of *flaviventris*, once it was met with.—E. G. R. WATERS, 184 Woodstock Road, Oxford: *July 20th*, 1928.

Colias croceus Fourc. (edusa F.) at Oxford.—On July 8th, about noon, I was much surprised to see a 'Clouded Yellow' in my garden. I quickly got a net and secured the insect, a male and in fair condition, and in my opinion an immigrant.—S. GALPIN, 48 Plantation Road, Oxford: *July 9th*, 1928.

Immigrant Lepidoptera in 1928.—The occurrence of *C. croceus* at this date, as above recorded, would appear to indicate a somewhat belated immigration of this butterfly. Individual examples have, however, been observed much earlier in the year (*cf.* 'Entomologist,' Vol. lxi, p. 167, July 1928). My niece

Mrs. W. Rowles (*née* Champion) assures me that she saw a 'Clouded Yellow' at close quarters in her garden at Raynes Park, Surrey, on or about May 1st, which was also observed by an entomological neighbour. Of other immigrants, *Plusia gamma* was first noticed fairly commonly on May 27th on open heaths in the New Forest, and a week later *Pyrameis cardui* put in an appearance, specimens of this butterfly being seen on nearly every fine day up to my departure on June 15th. At Oxford it has also been observed in small numbers, and even now odd examples in the last stage of wear and tear may be met with. On June 12th, on the summit of White Horse Hill, Berks (856 feet) my friend Mr. R. Baylis saw *P. cardui*, true to its well-known habit of seeking the highest ground available, congregated 'in scores, if not hundreds, and even settling on his boots.' *P. atalanta* would appear to have arrived in less numbers than usual, and I have not seen it at all this year. *Nomophila noctuella* Schiff., which generally accompanies these species in their migration, has also been in evidence, but only sparingly; and on July 12th, at Tubney, Berks, *Sesia stellatarum*, much travel-worn in appearance, but the first specimen I have seen here for several years, was busily 'nosing' along a stone wall in the burning sunshine after its familiar fashion. It is not too much to hope that, given favourable conditions of weather, the eyes of entomologists may shortly be gladdened by the sight of the progeny of these beautiful and interesting visitors to our islands.—JAMES J. WALKER, Aorangi, Lonsdale Road, Summertown, Oxford: *July 16th*, 1928.

Phalacrocera replicata L. in Scotland.—It may be interesting to record the occurrence of the larva of *Phalacrocera replicata* L. in a Sphagnum pool at Durness, Sutherland, June 17th, and of the adult fly, June 27th, 1928.—D. J. LEWIS, Trinity College, Cambridge: *July 12th*, 1928.

A new British Braconid.—In the course of our investigation of the pests of store products, we have found a Braconid hitherto unrecorded from England. This is *Doryctes gallicus* Reinhard, kindly identified for us by Dr. J. Waterston. The single specimen, a female, was found on the window of a warehouse at Fresh Wharf, E.C., in April of this year. T. A. Marshall (in André, Species d'Hyménoptères, Les Braconides, 1888, pp. 227–8) gives *Callidium sanguineum* L. as the host. This beetle, or some allied species, might have been present in the wood of which fruit packing-cases are made, though on this point we have no positive evidence. This species of *Doryctes* differs from its closest English ally, *D. imperator* Hal., in having the postscutellum produced into a blunt spine, and in the much shorter ovipositor, which is only two-thirds as long as the abdomen.—O. W. RICHARDS and W. S. THOMSON, Dept., of Entomology, Imperial College of Science, London, S.W.7: *July 7th*, 1928.

Review.

'THE SOCIAL WORLD OF THE ANTS COMPARED WITH THAT OF MAN.' By DR. AUGUSTE FOREL. Translated by C. K. OGDEN, Editor of 'Psyche.' Vol. I, pp. xlv+551, plates i-ix. Vol. II, pp. xx+445, plates x-xxiv. London and New York: G. H. Putnam's Sons, Ltd. 1928.

'Le Monde Social des Fourmis,' the *magnum opus* of the veteran Entomologist of Zurich, Professor Auguste Forel, has for several years past been well known and highly appreciated by those students of Nature who devote their energies and attention to the investigation of the structure, life-history, and habits of the most wonderful and fascinating members of the insect world. The

first volume in the original French edition was published at Geneva in 1921, and the fifth and final instalment appeared in 1924. Each volume in succession was adequately reviewed in the current English entomological periodicals by our most active and competent Myrmecologist, and the notices of the third and fourth volumes will be found in the pages of our Magazine for the year 1924.*

In its present English dress, this great work makes a still wider appeal than before to the whole body of Entomologists, and in even greater measure to that section of the public which takes an intelligent interest in Natural Science. Translated into fluent and admirable English by the editor of 'Psyche,' Mr. C. K. Ogden, these two handsome but somewhat ponderous volumes leave nothing to be desired in the way of printing, binding, and general get-up; and regarded as an exhaustive summary and a veritable encyclopaedia of all matters relative to these wonderful insects, the only book with which it can be compared is W. M. Wheeler's great treatise on 'Ants.'

In dealing with a work which embodies so great a wealth of detail, the space at our command is sufficient to allow us merely to touch on a few salient points in each of the five parts, corresponding with the original volumes, into which it is divided. The author in his Preface gives a very pleasing account of his observations on the habits of the ants in his garden during his early childhood; and the gift to him at the age of eleven years by his grandmother of a copy of Pierre Huber's 'Recheches sur les moeurs des fourmis indigènes,' was the real starting-point of his long life-work with these insects. Chapters treating of the evolution of the ants in general, and on the origin and development of the diversified sexual forms presented by so many of the species, are followed by an exhaustive and fully illustrated account of the anatomy, external and internal, of the perfect insects, the poison apparatus and the organs of the special senses being described in ample detail. In general the author follows the classification of Emery, the Ponerinae, the first of the recognised subfamilies, being regarded as the most ancient and primitive members of the Formicidae. Chapter IV, which deals with the geographical distribution of ants, is of particular interest; the 5,031 species and races and 1,256 varieties, geographical and otherwise, enumerated by the author in 1913, are very unevenly represented in the nine faunistic regions adopted. Thus the Neotropical ant-fauna includes no fewer than 1,465 species and 329 races, closely followed by that of Indo-Malaya with 1,165 and 210 respectively; while the 'Antarctic' fauna of New Zealand and Patagonia comprises only 27 species and two varieties. No ants appear as yet to have reached either Iceland or Greenland, though nine species have been found in Norway beyond the 68th parallel of North latitude. Full details are given (pp. 165–9) of the rapid extension by commerce of the range of certain objectionable species, notably that of the Argentine Ant, *Iridomyrmex humilis* Mayr., which has invaded Europe in quite recent times, and has become a common hothouse pest in many places in our own islands.

The second volume treats of the sensations of ants, their physiology and psychology, and the intimate association of many tropical species with the curiously modified growths of certain plants to which they are adapted and restricted. A long and most interesting chapter is given to the discussion of the mutual relations of ants and their animal guests and companions, the number of species of these at present known being not very far short of that of the hosts themselves; and full details of the construction and the varied forms of the domiciles of ants conclude this part.

* H. Donisthorpe, Vol. I, Entom. Record, xxxiii, pp. 59—60 (1921); Vol. II, Entom. Record, xxxv, pp 38—40 (1923); Vol. III, Ent. Mo. Mag., lx, pp. 89—93 (1924); Vol. IV, Ent. Mo. Mag. lx, pp. 140—42 (1924); Vol. V, Entom. Record, xxxvi, pp. 173—77 (924).

As stated above, the third and fourth volumes have been so fully dealt with in their original form in this Magazine, that it is here no longer necessary to consider them. The final volume yields to none of its predecessors in interesting matter, since it embodies a full account of the ravages of the terrible 'Siafu' or Visiting Ants (Dorylinae) of Africa, and of those of the almost equally formidable Ecitons of Tropical America, first made fully known by our great naturalist H. W. Bates. The details of the deliberate harvesting and preservation of seeds by many ants, observed of old by King Solomon, and the almost uncanny cultivation of fungi for larval food in the recesses of the underground nests of the genus *Atta*, so well elucidated in recent years by Dr. Jakob Huber in Brazil, make most enthralling reading. More wonderful, if possible, is the story of the methodical work of the Oriental leaf-weaving ants (*Oecophylla*) that make their arboreal nests by means of silk secreted by their larvae, which they use as living sewing-machines. To quote the author's words: 'We have here a fact almost unique in nature except in man—the use of one living creature by another as a working tool.' The author concludes with a long and deeply interesting 'Epilogue,' in which, however, we venture to think that his peculiar social and political views are put forward more prominently than is appropriate in a work of this nature. The appendix 'The War between the Ants and the Termites' by Prof. Edouard Bugnion, which appeared at the end of the original third volume, is a great addition to the value of the book, and there is an excellent Index of no fewer than 86 pages.

A much-needed improvement in this new edition is the rearrangement of the text-figures in conformity with their context, and certain errors and misstatements in the original have been duly corrected. The numerous plates, coloured and otherwise, depict a large number of the most bizarre and striking forms of the ant-world, and are of a high order of excellence; this remark also applies to the two portraits of the distinguished author, the frontispieces of each volume. To conclude, we may heartily congratulate author, translator, and publishers of this great work, one of the most notable additions to entomological literature in the English language that has appeared in recent years.—J.J.W.

OBSERVATIONS AND RECORDS FOR SOME THYSANOPTERA FROM GREAT BRITAIN. III. *CHIROTHRIPS MANICATUS* HAL. AND *LIMOTHRIPS* SPP.

BY GUY D. MORISON, PH.D., M.SC. (LOND.), NORTH OF SCOTLAND COLLEGE OF AGRICULTURE, ABERDEEN, N.B.

Chirothrips manicatus Haliday.

Priesner (1926, Die Thysan. Europas, S. 136-143) has written the latest description of this species, but after the examination of about 700 specimens it seems to me that his description needs emendation, since the insect shows even greater variation than the latitude he accords to it. Adult individuals range in size from large (1·4 mm.) to small (0·8 mm.) ♀♀, and large (1·16 mm.) to small (0·6 mm.) ♂♂, measured from the apex of the head to the the 10th abdominal segment when the insects are about no distended. Specimens with artificially distended segmen much longer than these measurements, which are probably the extremes that could be found during further search.]

the summer months ♀♀ of varying sizes occur together on grass in N.E. Scotland and S. England, with a predominance of larger ♀♀ in the North and of smaller ♀♀ in the South. Towards the end of summer ♂♂ of varying sizes occur with the ♀♀, and later they become very numerous and more so than the ♀♀. Also amongst them larger individuals predominate in the North and smaller in the South.

The species includes macropterous ♀♀ ranging from large to small in size; brachypterous ♀♀ only known from two large specimens found by me in Scotland during August, 1924; apterous ♀♀ presumably varying in size like Priesner's *manicatus* and hitherto only recorded from the continent of Europe; brachypterous ♂♂ (all my specimens) ranging from large to small in size; smaller ♂♂ (0·5 - 0·7 mm. Priesner) which are said to be apterous.

In brachypterous ♀♀ (mihi) and in apterous ♀♀ (Priesner), there is no comparative reduction in the size of the pterothorax, nor does the chaetotaxy consist of stronger hairs in my brachypterous ♀♀. In brachypterous ♂♂ ocelli are absent, there being no correlation between them and vestigial wings, but they are present and normal in the brachypterous ♀♀.

Colour is as described by Uzel (1895, Monogr. Ordn. Thysan. S. 80-83) and Priesner (loc. cit.); the larger specimens tend to be darker than the smaller ones. The form *adusta* is quite common amongst the smaller young imagines of both sexes.

I made careful measurements of twelve selected ♀♀ and six ♂♂ of various sizes from N.E. Scotland and S. England, and with these I compared a great number of other specimens from the same localities. A large insect is very similar to a small one when they are considered at a size common to both. There is no morphological character specially linked to largeness or smallness, but individual variations exist and would be sufficient to cause some specimens, if these were examined alone, to be isolated as distinct species from Priesner's definition of *manicatus*; yet these variations are found to be of no specific importance when a long series of insects is studied.

To emend Priesner's description and Bagnall's scattered notes of the morphology of *C. manicatus* Haliday, I append the following statement:—Measurements in μ. Macropterous ♀. Head, length to fore margin of eyes 75-87, width at base 87-140, across eyes 85-127; length from anterior end of head to line across fore margin of eyes, 23-30; eyes, maximum length 43-65, width 23-36; the inner angle of the eye is separated from the lateral ocellus of its side by about the distance of one of its own facets. The inner angle is almost a right-angle, but rounded. The anterior ocellar lens is not quite half the area of each lateral ocellar lens with both of which it forms the apex of an obtuse-angled

triangle of about 110° measured from the most anterior point of the median lens to the most lateral point of each lateral lens. The distance between the lateral lenses is double that between the anterior and each lateral lens. The interocellar hairs usually lie in front of the anterior ocellus, but one is often displaced backwards. Length : width, antennal segment I, 18-23 : 32-40; II, 20-29 : 29-40; III, 23-32 : 20-26; IV, 26-35 : 23-29; V, 18-29 : 18-24; VI, 29-40 : 16-24; VII, 6-11 : 5-6; VIII, 7-14 : 4-5. Total length of antenna 150-217. Pronotum, length 110-210, width at anterior 98-180, at posterior 152-276. Width at posterior : length 1·3-1·6 : 1. Length of long hairs at posterior angles of pronotum, 30-63. Mesothorax width 185-330. Pterothorax length 133-230. Fore wing length 590-936, width across alula 55-92, across middle 38-50. Costa bears 15-26 stiff hairs, 1st vein 2-4+3-4+1+1, 2nd vein 4-8 hairs. The length and stiffness of the stiff hairs of the fore wing is variable as well as the length of the fringing hairs. The alula is the darkest area of the fore wing. Abdomen, length : width at segment V, about 2·3-2·8 : 1. Abdominal segment IX, length 43-72, width at base 92-160, at apex 50-90; X, length 60-95, width at base, 43-92, at apex 12-20. Longest hairs on abdominal segment IX, 70-130, on X, 90-145. Ovipositor, length 130-220.

Brachypterous ♀. Same proportions as a large macropterous ♀. Fore wings, length 145, width across alula 90-100, costa and 1st vein each with 5 stiff hairs, apex of wing broadly rounded; alula, length 104-108, width 45, practically normal, and with normal chaetotaxy. Hind wings present, but I cannot distinguish their details.

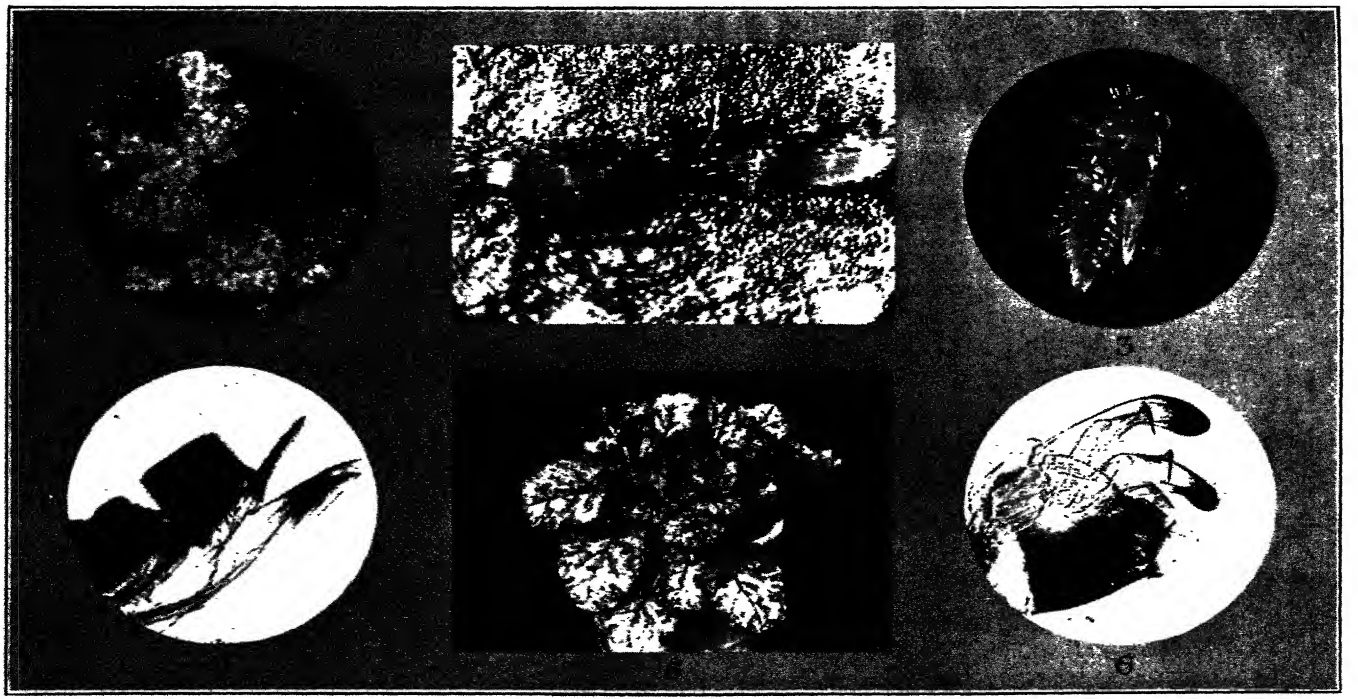
Brachypterous ♂. Head, length to fore margin of eyes 53-66, width at base 90-116, across eyes 87-107; length from anterior end of head to line across fore margin of eyes 17-34; eyes, maximum length 32-49, width 20-26, shaped like those of female. Antennal segment I, 20-23 : 32-37; II, 18-23 : 29-32; III, 23-26 : 20-23; IV, 23-29 : 25-29; V, 14-22 : 20; VI, 20-29 : 15-17; VII, 6-9 : 4-6; VIII, 6-9 : 4-5. Total length of antenna 150-174. The process of segment II is somewhat smaller than in the ♀. Pronotum, length 130-180, width at anterior 100-136, at posterior 188-246. Width at posterior : length, 1·35-1·5 : 1. Length of long hairs at posterior angle of pronotum, 20-40. Mesothorax, width 200-275. Pterothorax length 116-160. Fore wing present as a round scale, length 22-54, width 20-37 with 3 stiff hairs along costa. Hind wings also present, but I have not been able to distinguish their details. Abdomen, length : width at segment V, about 2-3 : 1. Length : width of area of delicate chitin on urosternum III, 20-30 : 30-43; V, 17-30 : 30-50; VII, 14-26 : 17-37. A similar area when it is developed on urosternum VIII, is usually very small. Longest hairs on abdominal segment IX, inner 64-90, outer 52-87, on X, inner 87-100, outer 70-80. Chitinous genitalia measured in a straight median line, length 100-130.

Deformities when present usually occur in the intermediate antennal segments. One of my ♀ specimens has a single long hair at each posterior angle of the pronotum, and sometimes one of these hairs may be short and stumpy.

I have captured the insect in numbers for six years. In N.E. Scotland ♀♀ appear numerously on grass about the middle of May and ♂♂ at the end of July, whilst both sexes disappear during September. In the counties round London, I found ♀♀ May-October, ♂♂ July-October, and probably the ♀♀ appear in April and the ♂♂ in June. I have found hundreds of both sexes on

grass in Chiswick and other suburbs of London. Nymphs occur in August, but I have taken very few of them and no prepupae or pupae. Grass of many species, oats, barley, *Juncus* and various Dicotyledons often harbour the insect, but I have never been able to ascribe definite damage to grass by this species even when hundreds of insects were present on a few square yards of grass-land. Close grazing or mowing of grass land should prove an effective control for the insect. The winged females may migrate, for I have found them blown by the wind on to me whilst cycling near Burnham Beeches, Bucks, in early May. The species seems univoltine, at least in N.E. Scotland, where the females that appear in May have the ovarioles containing only very small eggs, which are not ready for deposition till early June. It is impossible at present to ascribe an age for the majority of these ♀♀, but some are certainly very young, so there is the probability that they passed the winter in a pre-adult instar. Nevertheless, in spite of repeated search, I have found no instar of the insect hibernating in the upper parts of living grass plants, though Williams (1913, Journ. Econ. Biol. S., p. 219) records finding ♀♀ hibernating in a sedge stack in England.

Unfortunately Mr. Bagnall (1909, Journ. Econ. Biol, 4, pp. 34-35) has not written a description of *Chirothrips similis* Bagn. sufficiently detailed for the insect to be separated from some other species of its genus with any degree of accuracy. He describes some more morphological details later (1927, Ann. Mag. Nat. Hist. 9, xx, p. 565). He says (1927, Ann. Mag. Nat. Hist. 9, xix, p. 567) that *similis* Bagn. is *molestus* Priesner (Die Thysan. Eur. S. 136, 137, 142), which latter sinks as a synonym. However, I think that Bagnall may be confusing two species amongst his material of *similis*, because I have two ♀♀ caught by him at Ainsdale, Sandhills, 7/24, which agree with my description of large ♀♀ of *manicatus* and not with Priesner's description of *molestus*. Amongst the hundreds of both sexes of *Chirothrips* caught by me I have not seen one answering to Priesner's description of *molestus*. To consider with *manicatus* the comparative characters on which Bagnall institutes the species *similis*: The large size if measured from extended ♀♀ accords with that given by Priesner for *manicatus*; the broader basal antennal segment is a character of *aculeatus* Bagn. (=*similis* Bagn. Priesner), and Priesner does not mention this character for *molestus*; the comparative length and width of the abdomen I find varies in *manicatus*, and this is not a satisfactory character owing to its liability to distortion; six



(*G. H. Rodman photo*). ERYTHRONEURA PARVULA Boh.

hairs on the hind-vein of the fore-wing are not a specific character, since Priesner describes 4-6 hairs for *manicatus* and I have found 4-8 hairs, which are liable to variation in their comparative positions and in their numbers on either wing. Williams (1914, Entomologist, 47, p. 53) queries *similis* Bagn. as a form of the variable species *manicatus*.

I have deposited a series of males and females of *Chirothrips manicatus* Hal. in the British Museum (Natural History), and I have sent specimens to various Thysanopterists. Before publishing this description I tried to find if any of Haliday's specimens of *C. manicatus* still existed in a satisfactory condition. Mr. F. Laing tells me that the British Museum does not possess one of Haliday's specimens of this species, and I thank Messrs. Huckley and Stelfox for informing me that all that exists of Haliday's collection of Thysanoptera in the National Museum of Ireland consists of carded specimens which are greatly mixed up.

Limothrips cerealium Haliday.

In N.E. Scotland winged ♀♀ of this species appear on grass about mid-April and early May. Most of them are very dark and robust, but some are much paler and perhaps younger, though in all the ovarioles contain only very minute immature eggs. These ♀♀ later oviposit in oats, barley and other Gramineae, and the insects which hatch from the eggs complete their entire metamorphosis on the host plant on which they appear as adult about the middle of August. Owing to the number of adult ♀♀ present and to the intervals between the laying of the individual eggs of an insect, there is an overlapping of the instars during the end of July. It seems probable that certain of the parent ♀♀ will survive long enough to be present on the plant with their adult offspring. Adult ♂♂ first occur on the plants in August and apparently they are all the progeny of the ♀♀ which occurred in April and May. The later instars of the ♂ are easily distinguished from those of the ♀, because of the small size of the ♂♂ and through their lack of wings. Adult ♂♂ are much the more active sex. Towards the end of August and in early September ♂♂ are as common as ♀♀, with which they try to mate frequently, but often unsuccessfully. By the end of August or in early September, when the grain is ready for harvest, only adult insects are present in the ears of grain, where they are often very numerous even after the binding of the sheaves. Males disappear from grass before the end of September, but females may be found till about the middle of October.

Though adult ♀♀ are found on a large variety of plants, the species seems practically confined to Gramineae during its nymphal instars, and besides cereals the tall grasses around the margins of fields and on waste-land provide a breeding-place. The alate ♀ flies readily during sultry weather. It is well known that she spreads the species. Her wings enable the insect to be as numerous at harvest-time in the middle of a large field as at the sides, even when the cereal crop follows a root crop which could not have supported her species during the previous year; whilst the commonest of grass thrips, *Aptenothrips rufus* Gmelin, being wingless, is limited to the fringe of large fields when the crop of grass or cereals follows a cleanly cultivated root crop. Miles (1926, Ann. Appl. Biol. 8, p. 177) states that *Limothrips cerealium* (Hal.) feeds throughout the winter (in England) in the larval stage in hollow-stemmed grasses. The few pale ♀♀ seen in spring offer the most support to the theory that some ♀♀ hibernate in an immature stage. But I have unsuccessfully examined much grass during winter for *L. cerealium*, though the immature stages of *Aptenothrips rufus* are not uncommon between the sheathing leaves. On the whole the evidence points to the species hibernating as adult ♀♀ probably rather deep in the earth or in thick grass, under bark, etc., where they have been found by various authors.

Much has been written about the damage done to cereal and grass crops by this species commonly known as the Corn Thrips. It is usually blamed for at least some of the 'blindness' of grain seen in a cereal crop. This is a very plausible explanation, but it really needs demonstration under rigidly controlled conditions, for a review of the extensive literature shows that this has not been done. One or more seeds in an ear of grain may be affected by 'blindness,' *i.e.* the seed does not form at all, or is very small, whilst its glumes appear whitish and paler than the rest in the ripening ear. Blindness may be caused by other insects, fungi or cultural conditions. It varies in different cereals and in different localities, and some varieties of grain are more susceptible to it than others.

Once, from Forfarshire, I received a sample of wheat badly affected by both *L. cerealium* and the larvae of a midge identified as *Sitodiplosis mosellana* (Géhin) by Dr. H. F. Barnes. Curtis (1883, Farm Insects, pp. 285-289) describes a very similar attack on wheat by *L. cerealium* and the larvae of the Wheat Midge, *Contarinia tritici* (Kirby).

According to literature, the species *L. cerealium* includes macropterous and apterous ♀♀ and apterous ♂♂. Further

search will probably reveal ♀♀ or even ♂♂ with wings of such various degrees of smallness as are quite common amongst grass-dwelling Thripids. During the last six years I have found only macropterous ♀♀ and apterous ♂♂ which I consider as belonging to this species. They occurred in Aberdeenshire and Kincardineshire and in the counties round London, and about seventy adults and fifty immature instars were sent to me from Forfarshire. From these localities a series of sixty ♀♀ and twenty ♂♂ properly mounted, and of about a hundred ♀♀ and fifty ♂♂ unmounted, seems to me to show that on the whole a larger and darker race (of both sexes) is commoner in the north than in the south. But the two races occur together and there is no specific distinction between them, whilst intermediate specimens link them together completely; nor is the character of a particular size constantly linked with a particular colour. For *Chirothrips manicatus* Hal. I have described a similar case of larger and darker individuals being commoner in the north than in the south, and this is a phenomenon which is quite usual amongst some Lepidoptera common to the two regions.

Bagnall (1927, Ann. Mag. Nat. Hist. (9) 20, pp. 565-567, and 1928, Ent. Mo. Mag. 64, p. 95) has described *Limothrips minor* based chiefly on ♀♀ from Sardinia, S. Europe and England. Through his kindness I have two ♀♀, paratypes collected by Krausse in Sardinia. Some of my specimens from Great Britain are inseparable from the paratypes of *minor*, besides fitting closely to the measurements given by Bagnall, but I consider that these ♀♀ are *cerealium* Hal., of which *minor* Bagn. is a lighter coloured and often smaller race found most commonly in the south. I took detailed measurements of seven chosen ♀♀ (and seven ♂♂) and compared them with those of the two paratypes of *minor* and with Bagnall's measurements of the two species, besides Priesner's description (1926, 1928, Die Thysan. Eur., pp. 144-145, 150-154, 708)) of *cerealium* Hal., though the only measurement given by Priesner is the length of the ♀, and, without noticing it, he almost certainly includes *minor* Bagn. in his description of *cerealium* Hal. My conclusion is that two species cannot be separated on the basis of measurements, colour or size of either sex. These are the three characters from which Bagnall describes specific differences, but I find that they vary more than stated by Bagnall and that they are completely interlinked with one another.

The ♂♂ are coloured very like the females, only they are usually lighter, and I have never found one as dark as the darkest ♀♀. They are variable in size—a large ♂ being half as large

again as a small ♂. One of my specimens has three small ocelli each with a little hypodermal pigment, and two other specimens have each a vestigial lateral ocellus. Amongst young imagines of both sexes *adusta* forms are quite common.

I have deposited many specimens of this species in the British Museum (Nat. Hist.).

Of late measurements have been employed very considerably in the description of Thysanoptera. If exactly defined they are the most accurate form of description. They are most useful when based on a long series of a species or when employed for a unique type specimen. Lutz (1908, Carnegie Institute of Washington, Publ. No. 101, pp. 1-63), in his paper on the variation and correlations of certain taxonomic characters of *Gryllus*, gives a most interesting account of the value of basing species on statistical measurements. Also Michaeloff (1927, Archiv f. Bienenkunde, 8, S. 289-321) has applied statistics to the honey-bee to show that the worker progeny of a single queen varies in certain morphological skeletal characters influenced by the season and other factors.

Limothrips denticornis Haliday.

I have found ♀ ♀ of this species on various grasses and cereals in Aberdeenshire and Kincardineshire from the end of April to the middle of August. At Burnham Beeches, Bucks, a specimen was taken in June, and another one at Oxshott, Surrey, at the end of September. The only ♂ I found was in Kincardineshire in August. The insects favour long grass and cereals, but on none of the fourteen occasions during which I found specimens did they occur in large numbers.

Entomological Department,
Marischal College, Aberdeen, N.B.
July 7th, 1928.

DORCATOMA DRESDENSIS Hbst. AND *D. SERRA* Pz., TWO NEW BRITISH INSECTS. WITH NOTES ON THE OTHER BRITISH SPECIES OF THE GENUS.

BY HORACE DONISTHORPE, F.Z.S., F.E.S., ETC.

On April 22nd, 1924, I took home a piece of 'Tinder Bracket' fungus (*Fomes fomentarius* Fr.) which was growing on an old oak tree in Windsor Forest, as it was seen to be inhabited by Coleopterous larvae. It was placed in a tin, and in June, 1925, very many specimens of a *Dorcatoma* emerged from the same. As

these specimens were longer than, and differed from *D. flavicornis* in other respects, I unfortunately jumped to the conclusion that they were *D. chrysomelina*, and distributed a number of specimens as such.* These now prove to be *D. dresdensis* Hbst., which, as will be shown later, reinstates this species into our list of indigenous Coleoptera.

On June 13th, 1928, I found a *Dorcatoma* breeding in the 'Dryad' fungus (*Polyporus dryadeus* Fr.) in a hollow beech tree in Windsor Forest. The beetle occurred in numbers, and was found to be present on subsequent dates in July. These insects my friend Mr. K. G. Blair and I worked out at the Natural History Museum and identified as *D. serra* Pz. To make certain, I sent specimens to my friend Col. Deville, and he replied that they are this species without doubt. This is an addition to the British list.

The following is a translation of Reitter's table of *Dorcatoma* in the 'Fauna Germanica' 3, 318 (1911):

1″. Elytra with double puncturation, close and rugulose, hence somewhat dull.

2″. Elytra with fine, entirely decumbent, simple pubescence. The abdominal sternites fused in the middle. Blackish or brown. 1·5–2 mm. In rotten red wood of oak, often in numbers ..... *flavicornis* F.

2′. Elytra with shorter, but more erect, pubescence; the abdominal sternites not fused. Body black, shining. 2 mm. With us generally distributed, but rather scarce ..... *chrysomelina* Strm.

1′. Elytra with simple, or double, puncturation, but not rugulose, shining.

3″. Upper side with quite short decumbent and simple pubescence. Elytra without rows of erect hairs.

4″. Elytra simply and finely punctate, the punctures well separated, somewhat stronger than those of the thorax. The lateral striae sulcate behind and coarsely punctured in the groove. Near the suture at the apex there are from 2–4 rather widely separated punctures. Black, shining. The antennae rust-red. 3–4 mm. In tree fungi in dry rotten wood of living or dying trees, particularly oaks ..... *dresdensis* Hbst.

4′. The upper side with very fine close and similar punctures, only the first lateral strin of the elytra towards the apex lightly sulcate and less coarsely punctured, the second simply incised, and the third abbeviated, situated anteriorly, and as a rule not noticeable. A little smaller and more elongate than the above-mentioned species, otherwise similar. 3 mm. Rare ..... *punctulata* Muls.

3′. The upper side with rough, because erect, though short pubescence. Elytra with or without rows of hairs; only two lateral striae.

5″. Elytra without rows of hairs; the short yellow pubescence is directed partly backwards and partly towards the sides. Body blackish brown or rust red; antennae red. 1·7–2 mm. In red rotten beech wood, rare. ..... *serra* Pz.

5′. Elytra with longer, light yellowish grey pubescence, with distinct rows of erect hairs. Upper side finely punctured. Black, more rarely red-brown

* I have quite forgotten to whom I gave these specimens, and shall be much obliged if anyone who has them will kindly let me know.

(immature). Antennae and legs yellow-red. 1·7–2 mm. In tree fungi, rare ..... *setosella* Muls.

Of these the following species have been identified as British :—

D. flavicornis F. This insect was first recorded as British by the late E. W. Janson (Ent. Ann., 1858, p. 75), who took it in a decaying oak in the Metropolitan district in July, 1857. Fowler [4, 197 (1890)] says it is rare in decaying trees and gives the following localities : Forest Hill (Marsh); Purley (Douglas); Birdbrook and Esher (Power); Southend and New Forest bred in numbers (Gorham); Hastings District, Hurst Green (Butler); Sherwood Forest (Matthews). In the Supplement [Fowler and Donisthorpe, p. 281 (1913)] we add Cobham Park (Walker); Market Bosworth (Bouskell and Donisthorpe). On July 8th, 1904, when in company with Mr. Bouskell, I found it in plenty in an old tree at Market Bosworth. I have taken it singly in Windsor Forest by evening sweeping on July 31st, 1925, and on freshly-cut stacks of oak wood on July 24th, 1925, and August 17th, 1926. It was taken at Credenhill, Herefordshire, by E. A. Butler.

D. chrysomelina Stm. (*dresdensis* F., Ill., *nec* Herbst.). E. W. Janson (Ent. Ann. 1861, p. 69) took this species in an old oak in a hedgerow near Peckham on June 21st, 1849, when in company with Messrs. F. Smith and T. Ingall, who had previously taken it there. He pointed out that Fabricius and others had mistaken this insect for the *dresdensis* Herbst., and he considered that Stephens' records of *dresdensis* really referred to *chrysomelina*. Stephens had recorded it—*sub dresdensis*—as 'very rare, Suffolk, Cobham, near London, and Barham, in July and August.' Fowler gives Peckham (Smith and Janson); Richmond Park; Esher; Hyde Park, in old oak (S. Stevens); Tonbridge (Horner); Denton, Norfolk (Cruttwell); Barton, Cheshire; Stretford, near Manchester (Reston); Dunham Park, Manchester (Chappell). And in the Supplement we add : Sherwood Forest (Taylor); New Forest (Donisthorpe). On July 17th, 1906, I found it in fair numbers in red-rotten wood of an oak in the New Forest; and on June 19th, 1922, I took several specimens in an old pear tree at Hartlebury, where my friend Mr. G. H. Ashe had previously taken it.

D. dresdensis Hbst. As we have just seen, E. W. Janson considered that this species was incorrectly recorded as British by Stephens, but Mr. Blair tells me that the specimen in the Stephensian collection is really *D. dresdensis*. This species is mentioned as a British insect in the 'Catalogue' of G. R. Waterhouse in 1858, and as doubtfully British in his 'Catalogue' of 1861, and of those

of Rye, 1866, and Crotch, 1866, after which it was dropped from our lists altogether. My captures in Windsor Forest in 1924 firmly establish the species as British. There are, however, two specimens which were in the series of *chrysomelina* in the collection of British Coleoptera in the Natural History Museum, both of which were taken by Dr. Power at Esher, one on July 9th, 1870, and the other on July 8th, 1871.

D. punctulata Muls. This species was added to our list by the late Dr. D. Sharp on specimens taken by Mr. C. J. C. Pool near London [Ent. Mo. Mag. 50, 167 (1914)]. He gave some rather inadequate characters by which it might be identified. I am informed by Mr. Blair that the specimens in the National Collection standing under the name of *D. punctulata*, and taken by Mr. Pool at Enfield, are in reality *D. serra*. Should this be the case with all the specimens of Mr. Pool's capture, *D. punctulata* will have to be expunged from our list for the present.

D. serra Pz. The capture of this species in Windsor Forest during the present year is recorded in this Magazine (*antea*, p. 170). It is a decidedly fine insect, and when fresh is furnished with a beautiful golden pubescence, which is arranged on the elytra in the manner described by Reitter in his table. The antennae are exceedingly well-developed, especially in the male sex.

My best thanks are due to Col. St. Claire Deville and Mr. K. G. Blair for kind assistance in naming the species above referred to.

19 Hazlewell Road, Putney, S.W.15.
July 30th, 1928.

NOTES ON THE LIFE HISTORY OF *BERYTUS MINOR* H.-S. (HETEROPTERA, BERYTIDAE.)

BY W. E. CHINA.

Towards the end of May Dr. J. G. Myers captured a gravid female of *Berytus minor* H.S. at Farnham Royal, Buckinghamshire. The bug was placed in a glass tube with a flower spike of Meadow Fox-tail (*Alopecurus pratensis* L.). Oviposition went on intermittently from the 30th May to the 8th June. The eggs were laid amongst the glumes and were fastened by a little adhesive substance at the middle of one side. Hatching commenced on the 30th June, giving a period of rather more than four weeks for the duration of the egg condition.

Description of Egg (Fig. 1*a*):—

Smooth, shining, pale olive brown turning darker brown before hatching; cylindrical, rounded at each end, the surface distinctly but irregularly longitudin-

ally fluted or furrowed; the micropylar end distinctly broader than the posterior end, the latter somewhat narrowed, the former surrounded by five or six more or less globular micropylar processes, each with an apical pore.

Length 0·952 mm., greatest diameter 0·349 mm.

Similar in colour to the egg of *B. clavipes* F. (fig. 1*c*), which, however (see Butler E. A., Biol. Brit. Hemipt. Heteropt., p. 123, 1923, and Ent. Mo. Mag. xlix, p. 28, 1913), is much more slender, less robust, more parallel-sided and much more distinctly and frequently furrowed. The micropylar processes of *B. clavipes* are also less prominent. The measurements of the egg of *B. clavipes* are: length 1·2 mm., diameter 0·32 mm. The egg of *B. signoreti* Fieb. resembles that of *B. clavipes* more than that of *B. minor*, especially in the longitudinal fluting, but is shorter and measures: length 0·87 mm., diameter 0·32 mm.

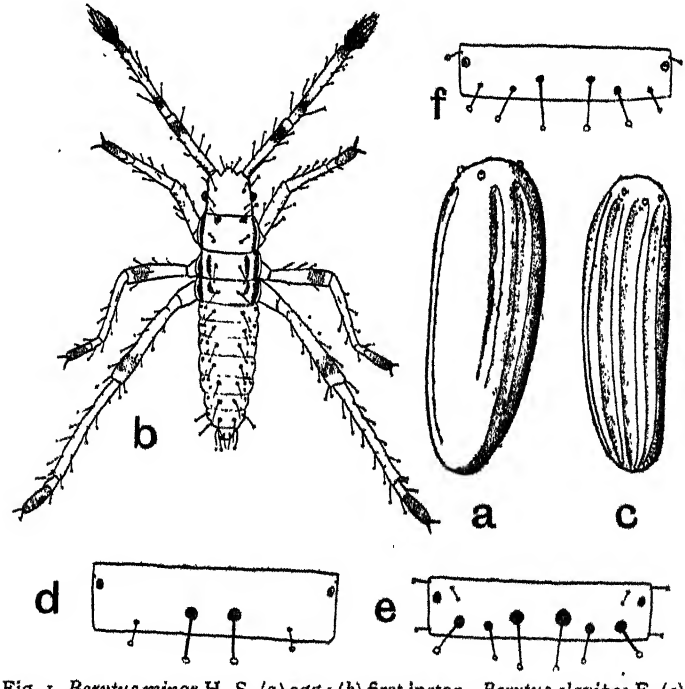


Fig. 1. *Berytus minor* H.-S. (*a*) egg; (*b*) first instar. *Berytus clavipes* F. (*c*) egg. Third abdominal tergite showing position of bristles: (*d*) *B. minor* H.S., (*e*) *B. signoreti* Fieb., (*f*) *B. clavipes* F.

The larvae were not reared beyond the first instar, but a description is here given.

Description of Larva (newly hatched) (Fig. 1*b*):—

Body narrow and cylindrical, legs moderately short and robust. Very pale

greenish yellow; eyes red; sides of head and thorax dark brown interrupted by a narrow white longitudinal stripe along the extreme lateral margin of the pro-meso- and metathoracic tergites; the dark brown lateral stripe of the head extends onto lateral base of first antennal segment which also bears a subapical brown annulation; apex of second segment, base and apex of third and the whole of the fourth antennal segment, more or less dark brown; a broad subapical annulation on all the femora and the apical (2nd) tarsal segments dark brown; claws black. Body and legs sparsely covered with pale hairs each ending in a crystaline globule; abdominal tergites each with a pair of blackish tubercles giving rise to a brown bristle ending in a crystal globule. Relative lengths of antennal segments 25 : 16 : 23 : 14, the apical segment fusiform. Head apically more or less rounded and flattened between the antennae; no indication of the frontal process of the adult. Rostrum extending to apices of middle coxae.

Total length 1·2 mm.

Similarly to newly-hatched larva of *B. clavipes*, but with the bristle-like hairs distinctly shorter.

The first instar larvae of this genus may be distinguished from one another by the number and position of the bristles on the abdominal tergites. The differences between *B. minor* (fig. 1*d*), *B. clavipes* (fig. 1*f*) and *B. signoreti* (fig. 1*e*) are shown in the figure.

NOTES ON *ERYTHRONEURA PARVULA* Boh. (HOMOPTERA).

BY GEO. H. RODMAN, M.D., HON. F.R.P.S.

PLATE II.

The following are a few observations on *Erythroneura parvula* made at the Royal Botanic Gardens, Kew, during the late autumn of 1927 and the first half of the present year. In view of the economic importance of this insect to glass-house owners, I think it desirable to put these notes on record.

Egg.

Transparent, colourless, elongated oval in form, 0·5 mm. long by 0·2 mm. broad. It is invariably laid in the substance of the veins on the under sides of the leaves of the plant upon which the insect lives. As the result of many observations, it is found that the main vein is seldom the site of oviposition, the eggs being usually found in the softer tissues of the secondary veins. They are covered by the thin cuticle. The long axis of the egg corresponds with that of the vein.

A careful search is necessary to detect its position, but a slight bulge in the vein serves to indicate the presence of the egg. Some little time before hatching the characteristic brownish red eyes of the embryo make their appearance and the position of the egg is made much clearer.

Eggs were more frequently found in the hot-houses at Kew during the months of February and March.

Hatching.

When about to hatch the larval head protrudes through the cuticular layer of the leaf, the remainder of the body follows, and with the aid of the hind legs the young larva clears itself of the enfolding tissues.

The actual emergence has been watched, but the number of observations will not justify an opinion as to the length of time occupied in the process. Roughly speaking, it may take an hour or so.

Larval Stages.

The newly emerged larva is whitish cream in colour with prominent eyes. It moves about on the under surface of the leaf but slowly. The exact number of ecdyses were not counted, but they probably number about five. With each instar the larva or nymph becomes stronger, and much more rapid in its movements on the under surface of the leaf. At the last moult there is a development of the wing structures, which at first are of a thickened character, lying alongside the body and becoming membranous only just prior to the appearance of the imago.

Moulting.

In effecting an escape from its integument the larva appears to insert its rostrum in the tissue of the leaf, securing in this way a fixed point from which to work. Exuviae of the various instars remain attached to the overhanging leaf, retained in position by the insertion of the rostrum.

Adult.

This measures about 4 mm. in length. When at rest it lies with wings and elytra closely applied to the sides of the thorax and abdomen. When disturbed it springs with great activity, and it is for this reason that it is captured with difficulty on a warm, sunny day. On a cool morning its movements are much slower, enabling it to be caught with comparative ease.

Photographs of the genitalia of the two sexes are appended.

The wings are iridiscent of bluish-white colour. They are covered by elytra of similar tint.

Host Plants.

At Kew Primulas (chiefly *effusa* and *malaoides* were the plants mostly attacked, others less affected being *Salpiglossis*, certain *Calceolarias* and *Nicotiana*. Elsewhere plants of *Geranium*, Lemon-scented Verbena and *Asparagus Sprengeri* served as hosts.

Effect upon the Plant.

The leaves become mottled and, in extreme cases, become variegated and almost white. The abnormal appearance is most marked upon the upper surfaces of the leaves.

Distribution.

In recent years this insect seems to have been gradually spreading. It has been recognised in the houses at Kew for several years, but has increased in numbers to a remarkable extent during the last twelve months.

Edwards (Homoptera of the British Isles, 1896) describes it as feeding upon low plants in damp places. He mentions Norwich, The Cotswolds, Lulworth, Torquay, Epping and Chobham as providing specimens.

During 1928 the existence of *Erythroneura parvula* in glasshouses of several professional growers and florists in the neighbourhood of London have come to my notice.

A point of interest may be noted that plants growing under vita glass provided more specimens than similar plants grown under ordinary horticultural glass.

Control.

Gardeners have complained bitterly about the difficulty of controlling this insect in greenhouses. Doubtless the trouble is traceable to the protected position of the egg. *Nicotine* in strong solution kills the larva and adult, but also the inflorescence of the plants. *Hydrocyanic acid gas* used at the normal strength of ½ oz. per 1,000 cubic feet failed, but if increased to double that strength killed the plants as well as the insects. The most promising course is the spraying or immersion of the plant in *Eucalyptus oil*. Any treatment should be repeated several times at intervals of a fortnight, so as to catch the newly-hatched larvae soon after their emergence.

10 Hazlewell Road, Putney, S.W.15.

August 1928.

Explanation of Plate II.

Fig 1. *Primula effusa* affected by *Erythroneura parvula*.
Fig. 2. *Primula forresti* affected by *Erythroneura parvula*, upper surface of leaf, ×10.
Fig. 3. 2 eggs of *Erythroneura parvula* in vein of *Primula effusa*, ×40.
Fig. 4. Last larval instar, ×28.
Fig. 5. *Erythroneura parvula* ♂, terminal abdominal sergent ×80.
Fig. 6. *Erythroneura parvula* ♀, terminal abdominal segment ×80.

THE GENUS *DESMOTHRIPS* Hood: WITH SPECIAL REFERENCE TO DIMORPHISM IN THE SEXES.

BY R. S. BAGNALL, F.R.S.E., F.L.S., AND REGINALD KELLY, F.E.S.

The male of the genus *Desmothrips* has hitherto been unknown as such, but recently one of us (Kelly) secured a series of *D. australis*, including an undoubted example of the ♂, which disclosed a new and interesting case of sexual dimorphism in the structure of the maxillary palpi and showed that the Aeolothripid genus *Archaeolothrips*, based upon the ♂ sex, was referable to the Orothripid genus *Desmothrips*.

Genus *DESMOTHRIPS* Hood

♂ = *Archaeolothrips* Bagn.

This genus was erected by Hood for the reception of *Orothrips australis* Bagn., and now includes five Australian species as listed herein. The discovery of the ♂ *D. australis* makes it necessary to modify the generic conception, and also to sink the genus *Archaeolothrips* as a synonym of *Desmothrips*.

The ♂ is smaller than the ♀ and, as in *Aeolothrips*, differs in having the antennal joints somewhat shorter, with the basal joints lighter in colour. The ninth abdominal segment is simple, the posterior angles not being produced in the form of claspers, but the striking feature lies in the structure of the maxillary palpi, which are formed as in *Aeolothrips*, the long second joint being formed by the more or less complete fusion of 5-6 small joints. When describing *Archaeolothrips fontis* Bagn., the author added:

'The simple ninth abdominal segment is common to the genera of the Orothripinae in which the ♂ is known—namely, *Stomatothrips*, *Erythrothrips*, and *Orothrips*—whilst the sensoria of *Desmothrips* are of the same general type as in the *Aeolothripinae*. Further, if the outline of the second joint of the maxillary palpus of *Aeolothrips* be examined under a high power, the form suggests that it has arisen from the completed fusion of five or six small joints, so that it is possible to picture a palpus substantially the same as in the Orothripinae of to-day. It is only possible to conclude that the Aeolothripinae have thus been derived direct from the Orothripinae.'

A critical examination of the maxillary palpi of both these male examples under a high power show complete to incomplete fusion in the second joints, one or more faint transverse sutures being observable.

Desmothrips australis (Bagnall).

♂ (=*Archaeolothrips fontis* Bagnall). A close comparison of the ♂ *D. australis* with the ♂ *Archaeolothrips fontis* shows that both agree very closely indeed; careful measurements of the joints of both the maxillary and labial palpi show an exact agreement, whilst the chaetotaxy of the abdomen is closely approximate. The

antennae of the present specimen are badly exhibited in the preparation, whilst the wings in the type specimen of *Archaeolothrips* are also badly shown, as they are laid over each other, but in both cases they approximate the antennae and wings of ♀ *australis*, and vary from each other but slightly. In one (*A. fontis*) the intermediate antennal joints are slightly longer than in the other, whilst the long median dark band of the fore-wing is slightly shorter, though in no sense approximating that of *propinquus*. This ♂ (*A. fontis*) was found with the type specimen of *D. tenuicornis*, but the short antennal joints 2 and 3 make it impossible to refer the ♂ to that species.

D. australis and *D. tenuicornis* were at first found on two native Australian plants, namely *Xanthorrhoea australis* and *Erythraea australis* respectively, but both have since been found on other plants.

Hab. 1 ♂ and several ♀♀ from flowers of rose, Healesville, Victoria.

The following is a catalogue of the known Australian species of the old family *Aeolothripidae* :—

Suborder *TEREBRANTIA*.

Superfamily AEOLOTHRIPOIDEA Hood em Bagnall 1927.

Family OROTHRIPIDAE Bagnall 1926.

Genus *Desmothrips* Hood 1915.

♂ = *Archaeolothrips* Bagn. 1924.

1. *australis* (Bagnall), 1914.

   Orothrips australis Bagn., Ann. Mag. Nat. Hist., ser. 8, xiii, p. 287; ♂ *Archaeolothrips fontis* Bagnall, 1924, l.c. ser. 9, xiv, p. 627.

2. *bagnalli* Karny, 1920.

   Acta. Soc. Ent. Cech., xvii, p. 36; 1924, Arkw. f. Zool. K. Svenska. Vetens.-Akad. 17A, p. 7, pl. 1, figs. 1, 2.

3. *obsoletus* Bagnall, 1924.

   Ann. Mag. Nat. Hist., ser. 9, xiv, p. 626.

4. *propinquus* (Bagnall), 1916.

   Orothrips propinquus Bagnall, l.c., ser. 8, xvii, p. 397.

5. *tenuicornis* (Bagnall), 1916.

   Orothrips tenuicornis Bagnall, l.c., ser. 8, xvii, p. 397; 1924. *Desmothrips tenuicornis* Bagnall, l.c., ser. 9, xiv, p. 626.

Family AEOLOTHRIPIDAE Uzel, s.str.

Genus *Rhipidothrips* Uzel, 1895.

6. *cinctus* Hood, 1918.

   Mem. Queensland Mus., vi, p. 121.

7. *kellyanus* Bagnall, 192 .
Ann. Mag. Nat. Hist., ser. 9, xiii, p. 584.

Superfamily MELANOTHRIPOIDEA Bagn.
Family MELANOTHRIPIDAE Bagn.
Genus *Cranothrips* Bagn.

8. *poultoni* Bagnall, 1915.
Ann. Mag. Nat. Hist., ser. 8, xv, p. 316, fig.

Edinburgh.
July 1928.

Sitones lineellus Gyll. and other Coleoptera at Sennen Cove, near the Land's End.—From July 3rd to the 13th I was staying at the above-named locality, and spent most of my time in quest of beetles, which, as may be surmised from the date, were extremely scarce. With the assiduous help of my friend Mr. Norman Micklewood, who accompanied me, thirty examples of *Sitones lineellus** were obtained—which may be reckoned as two per diem to each of us for the seven days devoted to their quest. I mention this to emphasize their scarcity. In the field and also when first examined at home, I thought that the species was *S. crinitus*, but careful examination proved them to be *lineellus* and this determination has been confirmed by my friend Commander J. J. Walker, so there is no doubt as to its accuracy. This is very essential, as the species has, I believe, not hitherto been taken south of Cumberland. It is also desirable to note that the specimens varied exceedingly in colour and marking. Twelve of them were quite fresh—perhaps the least bit immature, as the femora in some cases are pale—all these are also much more brightly coloured than the remainder of the capture, and in contrast to those may be described as entirely of a raw sienna tint, while that of the others may be called vandyke brown. Of the twelve fresh examples, three are without indication of spots on the elytra; six are distinctly spotted; three I gave away without examination Nine of the dark brown series have the pale scales of a warm greyish tint, which in three others are just sensibly greenish. The remaining nine dark forms are more or less badly worn, and it is possible that some of them may be survivors of the summer brood. Mr. Micklewood and I also took five examples of a large black *Sitones*, which raised hopes of something of exceptional interest, and we worked hard during the ten days at Sennen to secure those five. They proved to be abraded *S. griseus*—worn-out remnants of the summer brood.

The common *Hypera nigrirostris* F. occurred rather freely under *Ononis*, the pale form (ab. *stierlini* Cap.), and intermediates between this form and the type being dominant. Amongst the latter, two had a well defined thin line of green scales from shoulder to apex of each elytron. I also took one very similarly scaled at the Lizard in 1921; in some of the green forms the sutures are to a greater or less length from apex brown scaled, with the general clothing of green mixed with brown and a suggestion of lines of brown scales In one specimen the green elytra on the apical half are almost symmetrically spotted with brown, and have scattered spots towards the base, which in the scutellary region is marked with brown in a way very suggestive of the markings in *H. variabilis*. I also took one specimen of the brown form equal in size to examples of the var. *ononidis** Stevens, recently given to me by Col. Deville, and I therefore conclude that it is that variety. Capiomont, in his 'Revision de la Tribu des Hypérides,' 1868, described form of six variations of *nigri-*

rostris, but with us varieties of this species do not seem to have been common, or at all events to have received much attention from our authors. Canon Fowler, for example, describes the insect as being 'clothed with uniform green (sometimes light brown) hair-like scales' (Col. Brit. Islands, p. 237). Presumably the pale form has hitherto been a rarity to me, only three specimens having occurred during my long experience. I have, therefore, thought it desirable to record rather fully my recent observations. Of the green form I took twelve and of the pale twenty-four examples.

Three *Harpalus melancholicus*, three *Amara lividu* F. (*bifrons* Gyll.), one *Quedius schatzmayri** Gridelli and one *Meligethes subrugosus* were, I think, the only other species of interest that I obtained in the Cove, and in a boggy spot near the Land's End the only species that the water net produced worth noting were one *Paracymus scutellaris* Rosh (*nigroaeneus*) and one *Hydrop. obscurus** Sturm. Species starred are, I believe, new to the Cornish list.—James H. Keys, 7 Whimple Street, Plymouth: *August 17th*, 1928.

Hydrothassa marginella L., ab. devillei Bullock.—I took a specimen of this aberration, which has recently been described by Mr. Bullock (*antea*, p. 104) by sweeping near Caragh Lake, County Kerry, on June 17th, 1902. According to the Irish list the typical form is common and widely distributed in Ireland.—Horace Donisthorpe, 19 Hazlewell Road, Putney, S.E.15: *July 20th*, 1928.

'A List of the Coleoptera of Dorset (Additions and Corrections up to April 1927). By the Rev. E. J. Pearce, B.A., F.E.S.'—In our Magazine for February 1927 appeared a notice of Mr. Pearce's 'List of the Coleoptera of Dorset' recording over 2,000 species from that county. In the following April Mr. C. E. Stott published a number of additions to this list together with some localities for species already appearing in it. This information, with some other additions and corrections, forms the basis of the present supplementary list issued by Mr. Pearce under the auspices of the Dorset Natural History and Antiquarian Field Club, bringing up the total to the very respectable figure of 2,064 species and varieties. The Club and Mr. Pearce are much to be congratulated on a very useful piece of work.—K. G. Blair, 120 Sunningfields Road, Hendon, N.W.4: *August 3rd*, 1928.

Colias croceus etc. in the South of England.—It may be of interest to note that on July 29th I watched for some time two apparently quite fresh males of *Colias croceus* flying about the undercliff at Lyme Regis. Exactly a week earlier (July 22nd) I was with my friend, Mr. N. L. Andrews, at Bere Regis, when he netted a somewhat worn specimen of the var. *helice*.

Both *Vanessa io* and *Pyrameis atalanta*, with an occasional *P. cardui*, are frequenting the purple *Buddleia* in my garden; and *Nomophila noctuella* is just now coming to light in my house. As I write, two of them are fluttering round my lamp.—E. Ernest Green, Way's End, Camberley: *August 13th*, 1928.

The Oviposition of Calocoris bipunctatus Fabr.—It is interesting to record certain observations on the oviposition of this Capsid. On the evening of August 1st, 1928, large numbers of *Calocoris bipunctatus* were noticed on some chestnut 'spiles' used as supports for a wire-netting fence. On closer inspection they were observed to be gravid ♀♀ busily engaged in ovipositing in the wooden 'spiles,' the age of which varied from three to fifteen years. In all, probably several thousand ovipositing ♀♀ were observed between 6.30 and 9.30 p.m. As the posts were still soaking wet after a stormy afternoon, it was at first thought that this might be an accidental occurrence. On each ensuing day up to the time of writing, however, *Calocoris bipunctatus* has been observed

ovipositing in a similar manner, the posts being on some days quite dry. In addition, a single specimen of a species of *Orthotylus* was taken ovipositing in a fourteen year old chestnut post.

The method of egg-laying was as follows:—After drilling a hole in the post with the rostrum, the ♀ inserts the tip of the ovipositor, and, with body arched, works the ovipositor with a saw-like action, until it is deeply buried, when the egg is apparently laid. In many instances it was actually possible to watch the whole of this operation, through a lens of a magnification of 15 diameters. The whole process takes about half a minute. When first seen, ♀♀ were observed to lay eggs at the rate of 60 to 70 an hour.

It was common to find also the remains of an abdomen of *C. bipunctatus* with the ovipositor still imbedded in the wood, the rest of the body having been snapped off, possibly by a bird.

Portions of the chestnut 'spiles' were examined under a binocular microscope. When the wood was teased with a needle large numbers of eggs were found, laid closely together. Although when dissected from the body of the ♀, the egg of *C. bipunctatus* is yellowish and cylindrical as Butler describes it (Biology, Brit. Hemip. Heteroptera), when seen in the wood in which it is laid, it is white and distinctly flattened.

The possibility of other species of Capsidae ovipositing in dead posts in this manner should be borne in mind. It seems reasonable to suggest that *Lygus spinolae* Mey., recently found damaging hops in Kent, may oviposit in hop poles.—A. M. Massee and W. Steer, Research Station, East Malling, Kent: *August 8th*, 1928.

Reviews.

'The Biology of Insects.' By George H. Carpenter, D.Sc., Keeper of the Manchester Museum, University of Manchester: formerly Professor of Zoology in the Royal College of Science, Dublin. Pp. xv, 473, plates I–XVI, 88 text-figures. London, Sidgwick and Jackson, Ltd., 1928. 16/-.

This handsome and well-illustrated volume is the fifth in succession of a series of works on the biology of plants and animals by various well-known men of science, under the general editorship of Professor J. Arthur Thompson In the case of the great division of the Insecta, the vast and ever-increasing amount of material to be considered and co-ordinated is a veritable *embarras de richesses* to any writer, however extensive and varied his knowledge of the subject, who undertakes to present in detail the aspects of insects regarded as living creatures within the compass of a single volume. This onerous task, however, has been carried out most efficiently and successfully by Dr. Carpenter, and his book contains a wealth of detailed information from all points of view respecting the life-history of insects, and embodies the results of the most recent researches in Entomological science, presented in the author's well-known lucid and eminently readable style. It were perhaps invidious to indicate specially any one of the sixteen chapters into which the book is divided as being of greater value and interest than the others, but we would call attention to those chapters dealing with the instinctive and intelligent behaviour of Insects, their social life and adaptations to their haunts and seasons, and their relations to other organisms and to mankind, as appealing to a much wider circle of readers than that of professed students of biology in general. The chapter on evolution also presents, within a compass of little more than fifty pages, a masterly summary of the history of the progress and development of insect life, from its first recognisable beginnings far back in

geological time, to its infinite variety as we see it at present. Sufficient details of insect structure are, in the words of the author, 'described only as far as seems necessary for the understanding of function and behaviour,' and questions relating to systematic Entomology—including classification, 23 Orders of Insects being recognised—'are discussed only as they bear on problems of ecology and evolution.' The numerous excellent text-figures are mostly from well-known and fully acknowledged sources, while those of the equally good half-tone plates are reproduced from original photographs. We cordially congratulate the author on this substantial and highly interesting contribution to the literature of modern Entomology, which will assuredly be welcomed by Naturalists in general, and even more heartily by those specially devoted to the study of our Science.

'The Butterflies of Eastbourne.' By Robert Adkin, F.E.S. From the Transactions of the Eastbourne Natural History, Photographic and Literary Society. Pp. 1–58, plates I–XV. Eastbourne, at the Society's Rooms. 2/6 net.

East Sussex has long been known as a region exceptionally rich in Diurnal Lepidoptera, the list of its Macro-Lepidoptera compiled more than forty years ago by the late Mr. J. H. A. Jenner including no fewer than 55 species of butterflies Fifty of these have been observed within the land area bounded by a circle of seven miles radius from the Town Hall of Eastbourne, including all our better-known species and several decidedly uncommon kinds; and they have been very pleasantly described by Mr. Adkin in a series of three papers, read before the Eastbourne Natural History Society in 1927 and 1928, and illustrated by some 300 lantern slides from which the subjects of the plates in this little book are selected. The life-history of each butterfly is given in considerable detail, with special attention to the earlier stages, and the notices of *Colias croceus* (which evidently finds a highly congenial home at Eastbourne), *Pyrameis cardui*, and that rare visitor to the district *Polygonia c-album*, make highly interesting reading. The fifteen half-tone plates include a sketch-map of the district on a rather small scale, the remainder, reproduced from photographs by well-known experts, presenting details of structure and life-history. All these plates are of high excellence, and those which exhibit the metamorphoses of *Euchloë cardamines*, *Limenitis sibylla* and *Argynnis paphia* are specially pleasing. A good index concludes this excellent little work.

BIOLOGICAL OBSERVATIONS ON BRITISH PSOCOPTERA.

BY J. V. PEARMAN, F.E.S.

In the Psocoptera the processes of hatching and web-spinning have been carefully observed and described by several writers, but apart therefrom only a few scattered biological notices have been published, and much of our knowledge of the vital behaviour of European Psocids rests on inferential generalisations not entirely free from error. The case is a little better as regards some few exotic species. Takahashi has embodied a study of the life cycle of *Amphigerontia kolbei* End. in a paper, unhappily printed in Japanese, of which there is an all-too-brief English abstract by

Kaburaki, and Jacobson has recorded important observations on some Javanese species.

The following notes on oviposition, hatching, nymphal conditions and sex behaviour are the outcome of observations made during the past few years on captive and free-living examples of most of the species of Psocoptera occurring in the Bristol district. Originally limited to enquiries into the modes of oviposition, the investigations incidentally disclosed so much of the unknown that they are being continued more methodically, but several years must necessarily elapse before an exact and exhaustive account can be offered. Meanwhile, in order to present a reasonably complete survey of the ascertained facts of Psocid biology, reference has been made, as appropriate, to the records of others. Wherever in these notes the name of a genus is used in a collective sense it is to be understood as applying only to the species studied, of which a full enumeration is given in the course of the section on oviposition.

I. Eggs and Oviposition.

It has been generally accepted, on the authority of a number of observations and the dicta of monographers, that the normal habit of Psocids in oviposition is to place the eggs in little groups and over them to spin a web. Yet, so far from being universal, this habit is not characteristic of even a majority of the British species. A more common procedure, that of enclosing the eggs in a cement-like crust, has remained almost unnoticed, although attention was drawn to it over forty years ago. A few species leave their eggs entirely bare.

So far as verification has been possible, it has been found that all the species of a genus adopt the same habit, with some individual modifications. Where the observations of others appear to imply the contrary, the inconsistencies are merely those of nomenclature and not of fact.

Representatives of four native genera have been dealt with in a previous paper (11); reckoning *Nymphopsocus* and *Psyllipsocus* as probably congeneric, it is now possible to account for the remainder of the known British genera except two—*Embidotroctes* and *Kolbia*. A conspectus of the different methods of egg-disposal, with the genera respectively affected, may be shown thus:—

1. Eggs laid bare, i.e. without a crusty envelope, and
   (*a*) Not covered with a web ... *Nymphopsocus, Pterodela.*
   (*b*) Covered with a web ... *Caecilius, Ectopsocus, Graphopsocus, Stenopsocus.*

2 Eggs enveloped in a crusty coating, and
(*a*) Not covered with a web ... *Bertkauia, Elipsocus, Liposcelis, Peripsocus, Philotarsus, Psocus, Reuterella, Trichopsocus.*
(*b*) Covered with a web ... *Mesopsocus.*
(Position doubtful ... ... *Pseudopsocus.*)

The eggs themselves are in *form* long oval, usually rather narrower at one end (ovoid), sometimes bluntly rounded at both ends (oblong), or of regular figure (ellipsoidal); the *chorion* is delicate and flexible, with a smooth shining surface, occasionally exhibiting irregular fine creases, but not sculptured (except in three species as mentioned later), and either colourless transparent (when the eggs acquire a yellowish or purplish hue as the embryo develops), or opaque and dark coloured. They are, relatively to the parent, rather large, and the abdomen of the gravid female is much distended. Some representative proportions are indicated in the following measurements, which give the approximate lengths of the eggs, the ratios of length of egg to length of insect, and (in brackets) the comparative body lengths of the insects. *Liposcelis divinatorius*, ·33 mm., 1-3⅓ (2⅓); *Pterodela pedicularia*, ·37 mm., 1-4 (3⅛); *Reuterella helvimacula*, ·43 mm., 1-4 (3⅝); *Elipsocus westwoodi*, ·49 mm., 1-5 (5); *Psocus sexpunctatus*, ·41 mm., 1-7 (6); *P. longicornis*, ·57 mm., 1-8 (10). The number of eggs maturing contemporaneously in the ovaries is not the same in all species. For example, Mrs. Noland (10) found only one fully developed egg in each adult female *L. divinatorius*; in some species (e.g. *E. westwoodi*, *R. helvimacula*) I have found less than half-a-dozen eggs ready for laying, in others (e.g. *Mesopsocus unipunctatus*, *Psocus sexpunctatus*, *Stenopsocus immaculatus*) from ten to twenty. Of course the number of unlaid ripe eggs present will depend upon the age of the individual and the period that has elapsed between oviposition and dissection, but the specific peculiarity will be reflected in the number of eggs laid about the same time and the interval between successive ovipositions, matters I have not been able to study in detail. Egg laying activity extends discontinuously over about three months on an average, and the total production of a single female of the more prolific species may be estimated as from fifty to a hundred eggs, but of others (e.g. *Nymphopsocus destructor*) observations suggest that it may not exceed twenty to thirty. Some species scatter their eggs haphazard, and then, by chance, several eggs often come to lie in close proximity, but many species deliberately arrange them in groups. The disposition is nearly always horizontal, *i.e.* with the long axis parallel to the

surface on which laid; occasionally the apical end is slightly raised.

1*a*. *Eggs laid entirely bare.* Besides those previously recorded (11) there are two further species with a simple habit of oviposition. *Nymphopsocus destructor* End. is known only as an inhabitant of houses and cellars (especially where dim and dampish), but related species have been found in caves. The appearance of *Pterodela pedicularia* (L) in houses, though frequent, is to be regarded as due to accidental introduction, the insect and its congeners naturally occurring in the open on many trees and shrubs. It is noteworthy, in connection with its numerous manifestations indoors, that it exhibits a strong tendency to brachyptery.

Nymphopsocus destructor End. Eggs scattered, ellipsoidal, sculptured with tiny, alternately ranked, papillaceous processes; white, the chorion transparent and extremely delicate.

Pterodela pedicularia (L.). Eggs scattered (when on foliage usually beside the midrib or in the curled edges of dry leaves), oblong, boldly wrinkled longitudinally, opaque, bluish-brown with iridescent reflections.

Other records. Weber has described and figured (17) the eggs of his *Ocellataria* (=*Nymphopsocus*) *gravinympha*, a North American species. In form the egg is similar to that of *N. destructor*, but no mention is made of sculpturing; in the European species this is not easily made out owing to the delicacy and transparence of the egg.

1*b*. *Eggs, otherwise bare, covered with a spun web.*

Species observed:—*Caecilius fuscopterus* (Latr.), *flavidus* (Steph.), *'obsoletus'* (2 spp.), *kolbei* Tet., *Ectopsocus briggsi* McL., *Graphopsocus cruciatus* (L.), *Stenopsocus immaculatus* (Steph.).

The insects here grouped are difficult to rear, but mature females will oviposit in captivity, while the white patches of web formed by free living individuals are readily found in their haunts. The species are almost exclusively foliage frequenters, many evincing a preference for evergreens. Only exceptionally do they oviposit elsewhere than on leaves, and their egg masses have so much in common that one description will serve for all.

Usually from nine to twelve naked, ovoid eggs are laid in a natural depression on a leaf, irregularly grouped, close together, with their long axes usually unidirectional, and over the whole is spun a web of fine threads, crossing in all directions and fastened down to the leaf a little beyond the periphery of the egg mass, the separate threads firmly adhering to one another and to the underlying ova. The webs of *Ectopsocus, Graphopsocus, Stenopsocus* and *Caecilius flavidus* are closely woven and compact; other species of *Caecilius* construct webs of looser texture; *C. kolbei*, ovipositing

on sedge, merely throws a few threads across its somewhat rectangularly arranged egg batch. Shortly after completing its web, *E. briggsi* passes the tip of its abdomen across it two or three times and, so doing, smears it with a colourless air-drying secretion holding a few black granules.* When the leaf depression is sufficiently deep, a second web is formed at a higher level across the channel, this upper web varying from a few transverse lines (*E. briggsi*) to an extensive sheet of intercrossing threads (*C. fuscopterus*).

At first pale creamy, semi-transparent, as they ripen the eggs darken to yellow (*Ectopsocus, Graphopsocus*) or pearly purplish brown (*Caecilius, Stenopsocus*). Those of *C. fuscopterus* differ strikingly from the smooth ova of the other members of the group by being marked all over with a fine hexagonal reticulation; they acquire, at the end of a week, a beautiful deep blue colour, irridescent. There are seldom more than a dozen eggs under each web; the largest batch observed contained thirty-one (the first laying of a reared female *G. cruciatus*), and occasionally a solitary egg has been found carefully webbed over.

Other records. Peycrimhoff (12), Huie (7), and some earlier observers have described the egg mass of *G. cruciatus*; Ludwig (9) and Stager (13) that of *Stenopsocus stigmaticus* (Imh. & Labr.); Bremi's observation, quoted by Hagen (4), possibly refers to a species of *Stenopsocus*. From the U.S.A. two records have been seen: Ashmead (1), describing his '*Psocus*' *citricola*, says the eggs are laid under a web through which sooty particles are sprinkled, but see the reference to Hubbard, *2b infra*. According to the defined venation this insect is a Caeciliid, but the genus cannot be positively identified. Miss Wachter (16) found the web-covered eggs of '*Peripsocus*' *californicus* Banks; reference to Banks' description shows that this insect is not a *Peripsocus* but an *Ectopsocus*. Strand (14) records Fiebrig's discovery of the three-layered egg covering webs of an unknown Paraguayan species.

2a. Eggs overlaid with a crusty coating, not covered with a web. In contra-distinction to the insects of the preceding group, all but two of the species with coated eggs live and oviposit on bark or in other situations where grow their algal food plants. Of the two exceptions, *Liposcelis divinatorius* (Mull.), although occurring commonly in houses, is also found out of doors on or under bark; *Trichopsocus dalii* (McL.) is anomalous and peculiar in being

* Dark particles have been noticed on the webs of other species, but it has not been ascertained whether they have a similar origin.

as yet the only foliage-haunting Psocid, always ovipositing on leaves, known to lay cement encrusted eggs.

It should be noted that the species of the genera *Elipsocus, Peripsocus, Philotarsus* and *Reuterella* often, but not invariably, spin a few silken strands above their eggs. These random threads do not constitute a recognisable tissue-like canopy such as is formed by the foliage Psocids, and are not therefore considered as web formations in the strict sense, although they are probably indicative of an ancestral habit of weaving an egg covering shroud. Both *Phil. flaviceps* and *R. helvimacula* construct well-formed web shelters beneath which the insects reside.

Two types of encrustation are recognisable—the one a thick, amorphous plaster (sometimes incompletely formed); the other a thin, close sheathing. In each case the coating is separable into two elements, an inner, membrane-like pellicle that closely invests the chorion without adhering to it, and an outer layer of a granular nature firmly fixed to the pellicle. The binding cement is insoluble in water or alcohol. In every case the outer layer is homogeneous, but variously consists of minute, branny bark flakes, of fine algal fragments, or of dark gritty particles.

It is highly probable that the coating is in all cases applied to the eggs by means of an anal secretion (cf. *Ectopsocus ut supra* 1*b*, and Jacobson (8) on *Lichenomima*). The procedure can be described from an observation made on a female *Psocus quadrimaculatus* Latr. When first coming under notice, this insect was resting quietly beside two eggs that had been already deposited. After a while it began vigorously to rip off little pieces of bark, which were chewed and swallowed. In the shredding of the bark the mandibles were used, and though an occasional forward scraping motion was remarked it could not be established that the 'picks' were being employed. While so engaged the insect wandered about, but eventually returned to the neighbourhood of the laid eggs, where it stayed quietly. Motion of the intestines was now observable, and there was occasional spasmodic jerking of the abdomen. Presently the female began to circle about the eggs, applying the tip of its abdomen several times to the bark, and finally came to rest with its hinder end close beside one of the eggs. The normal posture was then resumed, and rhythmical abdominal contractions set in from before backwards. Soon a drop of oily, greyish fluid appeared between the anal flaps; the drop grew rapidly and was seen to be surrounding the egg and flowing around it, while particles of bark were passing out and floating in

the circulating fluid. When the egg was almost wholly extruded, the insect deflected the tip of its abdomen vertically to the bark. As soon as the egg was deposited, the surrounding fluid commenced to contract in a manner that suggested re-absorption, and the insect's anus remained in contact with the egg until shrinkage had ceased and the crust had hardened. At first the egg coating appeared dark, and was obviously moist; in about five minutes it was quite dry, and the light-brown bran-like particles showed up distinctly.

A noteworthy feature of the proceeding was the rapidity of the passage of the undigested bark through the alimentary tract—about fifteen minutes. That the digestive function is temporarily arrested during oviposition seems obvious, for it has been noticed that when an egg coat is composed of algal* fragments these are of exactly the same colour as the near-by growths, whereas the rejectamenta of digestion are always black. In the case of those species producing a dark, earthy plaster, it is possible that the products of digestion are utilised. The use of the abdominal apex in the selection of the place of deposit suggests a possible function for the apparently tactile sensory organs borne on the lateral telson flaps.

The following briefly describe the egg deposits of the species observed.

Psocus longicornis (Fabr.). A single layered mass of 80–90 eggs, their apices slightly raised, closely packed in slanting rows of about 7 to a row. The eggs are oblong, black, covered with a grey pellicle on which is a thin sprinkling of fine brown bark particles.

P. nebulosus Steph. A clumsy heap of about a dozen yellowish or cloudy greyish, long oblong eggs, thickly overlaid with a dense, hard, black, gritty plaster which, over the apex of an egg, often exhibits a shallow pit or a flap-like formation. Sometimes one or two eggs are incompletely covered.

P. bifasciatus Latr. *P. quadrimaculatus* Latr.	About a dozen dark, oblong eggs in a single layered group, thickly overlaid with light brown, branny bark particles, the whole forming a compact mass.
P. fasciatus (Fabr.) *P. variegatus* Latr. *P. sexpunctatus* (L.)	Scattered, oblong, dark brown eggs, each thickly covered with minute brown flakes of bark. The upper surface of the crust is flattened and marked with three fine ridges, a median and two lateral.
Elipsocus hyalinus (Steph.) *E. westwoodi* McLach.	Scattered, ovoid, brown grey eggs, with an amorphous but not dense coating (often deficient above) of brownish bark granules.
Peripsocus phaeopterus (Steph.) *P. subpupillatus* McL. *P. parvulus* Kolbe.	Scattered, occasionally irregularly massed, ovoid, grey eggs with a close-fitting, dark, rough, granulose envelope, somewhat pointed apically.

* Utilised when heavy growths obstruct access to the bark.

Reuterella helvimacula End. Eggs scattered, sometimes in groups of half a dozen, greyish, ovoid, closely wrapped in a somewhat granulose, leathery, dark greenish grey coat which is turned back frill-like over the apical area of larval emergence leaving a narrowly oval space uncovered except for the inner pellicle which is continuous. The act of oviposition has been witnessed and is similar to that of *P. quadrimaculatus* except that there is no preliminary searching of the site with the tip of the abdomen; in this species the female is without the sensory organs on the telson.

Philotarsus flaviceps (Steph.). Eggs scattered, laid either under the shelter webs or on the uncovered twig, greyish, ovoid; the granulose coating of woody fragments often overflows on to the bark surface, and like that of *R. helvimacula* is interrupted near the apex, dorsally, but in a narrower slit-like gap.

Bertkauia lucifuga (Ramb.). Scattered, ovoid, bright orange eggs having a close layer of greyish, gritty (rock) particles.

Trichopsocus dalii (McL.). Ovoid greyish eggs, with a black, granular crust evenly applied. Sometimes placed direct on a leaf surface, when the coating overflows, but more usually the eggs are strung on silken lines spun across a leaf depression.

Liposcelis divinatorius (Mull.). Eggs scattered, ovoid, translucent greyish with purplish iridescence, more or less thickly sprinkled with granular particles derived from surrounding objects; no enveloping pellicle observable.

Other records. Both Kolbe (Mon.) and Bertkau (2) mention the eggs of *Psocus sexpunctatus*, but without adequate description. The only other notices of similar methods of oviposition are those of Hubbard (6) for *Psocus* (= *Cerastipsocus*) *venosus* Burm., U.S.A., Green (3) for *Paramphientomum nietneri* End., Ceylon, Takahashi (15) for *Amphigerontia kolbei* End., Japan, and Jacobson (8) for *Lichenomima sumatrana* End., Java. The last-named species deposits the cementitious coating after the full number of eggs has been laid. See also Shipley, in Sedgwick's Student's Textbook of Zoology, 1909, Vol. III, p. 678.

2b. Eggs with both an enveloping crust and an overlying web. Only one species, living on bark, has been found to combine fully two methods.

Mesopsocus unipunctatus (Mull.) forms an egg heap very similar to that of *Ps. nebulosus* (2a), and then spins over it a web which is coarser than that of the foliage frequenting species, and suggests, by its stiffness, the after application of a hardening secretion.

Other records. Bertkau (2) correctly described the egg mass of *Mesops. unipunctatus*, but omitted mention of the web. Hubbard (6) gives an account of the egg mass of *Psocus citricola* U.S.A. differing somewhat from that of Ashmead (1), and intimating a habit similar to that of *Mesopsocus*.

Pseudopsocus rostocki Kol. Owing to the accidental loss of insects and eggs, memory must be relied on for a description. The eggs are aggregated in a mass of 20–30, and are black in colour. There is no web. As recollection suggests that they are shining, they may be laid quite bare, but by analogy one would expect them to have some kind of envelope.

Harrison (5) states that the eggs of the related *Lept(od)ella fusciceps* Reut. are laid singly, anchored by silken cables, and are at first white, later turning black.

It is difficult to estimate the value of the various protective devices. Stager (13) has shown that the web is no deterrent to the bug *Campyloneura virgula* H.-Schaff., and my experience has been that it is of little avail against the attacks of mites, which often also lay their eggs on or through the meshes. Coated eggs are in no better plight, not only mites but other Psocids (e.g. *Pterodela pedicularia*) finding no difficulty in breaking down the cement and devouring the contained eggs. Eggs lying in a dense cemented matrix might be safeguarded from Mymaridae, etc., and from parasitic fungi, but the lightly coated or overwebbed eggs are obviously not adequately shielded from such dangers. Both webs and encrustations might serve as shelters against adverse weather conditions, especially excessive rain; yet, on the other hand, eggs left entirely bare are able to withstand climatic rigours, from which, however, they are in some measure protected by being, usually, thrust deeply into crevices. The well-formed webs of the foliage frequenting species undoubtedly serve to keep the eggs in place, the threads being firmly glued not only to the leaf surface but to the eggs themselves; with care, a web may be removed intact with the eggs adhering to it.

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(*To be continued.*)

Hemiptera-Heteroptera in Suffolk.—It being fully 45 years since I last sent notes of this Order of insects to this Magazine, it may possibly be of interest to readers to state what was collected by the casual use of a sweeping-net during a short holiday spent in the neighbourhood of Barton Mills, Suffolk, in the middle of August last.

I was surprised to find so many larvae or undeveloped specimens, and may have missed some interesting species in consequence. The following is the list:—*Elasmostethus interstinctus* L. in abundance and in various instars; *E. grisea* L., a few; *Troilus luridus* Fab., two nymphs, one of which matured in captivity; *Myrmus miriformis* Fall., a short series; *Nysius thymi* Wolff., a single male which showed Oligomery of the left antenna; *Nabis apterous* F. and *N. limbatus* Dahlb.; *Ischnorhynchus resedae* Panz., one only; *Salda saltatoria* L., a pair; *Adelphocoris ticinensis* Mey. and *A. lineolatus* Goetze; *Lygus pratensis* L., *L. rubricatus* Fall., *L. viridis* Fall. and *L. contaminatus* Fall.; *Plagiognathus chrysanthemi* Wolff. and *P. arbustorum* F., two females of which were a small variety very different from the type; *Phytocoris varipes* Boh. and *P. tiliae* F.; *Camptobrochis lutescens* Schill.; *Heterotoma meriopterа* Scop.; *Orthotylus concolor* Kb.; *Stenodema laevigatum* L.; *Hypsitylus bicolor* D. & S.; *Psallus falleni* Reut.; *Anthocoris confusus* Reut., *A. nemorum* L. and *A. nemoralis* Fabr.

Of the above, *A. ticinensis* Mey. and *C. lutescens* Schill., according to Butler's table, are new to the county list. The country in that part of Suffolk is so varied in character that, with time at one's disposal, this list might well be added to. The disappointing feature was that the Scotch pines, larches and gorse yielded nothing with the exception of one *Lygus rubricatus* Fall. referred to above.

I am indebted to Mr. H. Britten, F.E.S , Mr. W. E. China, B.A., and my son H. R. P. Collett for assisting in verifying these captures, as, not having collected for so many years I had become very out-of-date in the nomenclature of the bugs, there having been at last two different lists published since I worked with Saunders' Synopsis.—Edward P. Collett, 8 St. John Street, Manchester: *September 15th*, 1928.

NOTES ON THE NEPTICULIDAE.

BY E. G. R. WATERS, M.A., F.E.S.

The splendid work done in past years on the British *Nepticulidae* by Stainton, Tutt, Dr. J. H. Wood, and other distinguished entomologists now departed has by no means exhausted the subject. In connection with these fascinating insects there still remain many obscurities, especially with regard to the limits of species and various points in their life-history; while the range of food-plants and the geographical distribution are in many instances still imperfectly known, and new or unobserved species undoubtedly await detection. The purpose of the following notes, based on personal observations, is to throw light on obscure points or to draw attention to problems hitherto overlooked.

Nepticula assimilella Z.

In Vol. LX (1924) of this Magazine, p. 102, I mentioned the occurrence in the Oxford district of a *Nepticula* on the grey poplar (*Populus canescens*). While some *Nepticulae* are extremely easy to rear, others seem to be exceptionally difficult, and the insect in question belongs to the latter category. Larvae were found at Cothill (Berks) each successive September from 1923 to 1927, sometimes in good numbers, yet every batch proved a failure until the present year, partly owing to parasites, partly no doubt owing to mismanagement on my part. The yellowish-green larva and its mine—a long widening gallery with central frass-line, either curved or angular, and sometimes compressed into an apparent blotch—were not unlike those of *N. trimaculella* Hw., the common species on black poplar; but whereas the mine of *trimaculella* runs away from the egg at the very outset, the mine of this species was noticed always to begin with a tiny bunch of convolutions, or at least to circle once or twice round the egg, resembling in this respect the mine of *N. assimilella* Z. The larva also agreed with *assimilella* better than with *trimaculella*. Dr. Martin Hering, of Berlin, to whom I submitted mines, suggested independently that they might be *assimilella*. This conjecture has now proved to be correct, three specimens of *assimilella* having been bred on April 4th, May 19th, and June 2nd, 1928, from the larvae on grey poplar. The occurrence of *N. assimilella* on *Populus tremula* in woods near Oxford has long been known to me, the empty mines being sometimes fairly common, though here again my efforts to breed the moths have been unsuccessful; but *Populus canescens* (regarded by some botanists

as a hybrid between *P. tremula* and *P. alba*, the latter being a rare tree round Oxford) is an unrecorded food-plant. There is no perceptible difference between the mines on *P. canescens* and those on *P. tremula*, except that the latter are more often affected by the leaf-nervures, being in many instances confined between two of the principal ribs. The mines from both aspen and grey poplar have all been obtained from young trees and low bushes, especially suckers with large leaves, in September and early October. The fact that no trace of mines has been found in the summer, and the reluctance with which the imago emerges when subjected to warmth, indicate that *assimilella* is single-brooded in this district.

Nepticula sp.? on *Sanguisorba officinalis*.

It is surprising that no species of *Nepticula* has yet been detected in Britain on the Greater Burnet (*Sanguisorba officinalis*), seeing that at least three species are known to feed on that plant on the Continent. On October 1st, 1924, I came across two empty *Nepticula* mines, one imperfect, in the leaflets of a plant of *Sanguisorba* growing on the edge of a field near Stanton St. John (Oxon). Subsequent searches in the same spot having failed to reveal any more mines, I conclude that these two were of accidental occurrence, and probably due to stray larvae of *N. centifoliella* Z., which is common on *Rosa canina* close by. The mines are long twisting galleries, with a central line of black excrement throughout, agreeing in all particulars with those of *centifoliella*. Entomologists in whose area *Sanguisorba* grows freely would nevertheless do well to watch the plant carefully for *Nepticula* mines.

Nepticulae on *Pyrus Aucuparia*.

Of the three known British species on mountain-ash, *N. sorbi* Stt. is the most easily detected, its larva disfiguring the leaves with a large and conspicuous oval blotch, greenish at first, but turning brown when the larva has departed. It is worth pointing out that *sorbi* has a wide distribution in Wales and southern England. On June 22nd and 23rd, 1928, larvae were found in plenty in the woods of west Gloucestershire (Symond's Yat and Staunton); while I have noticed the empty blotches in Caernarvon (common near Penmaenmawr), Monmouth (Llanthony), Surrey (Hindhead), Sussex (Blackdown), and Hampshire (Waggoners Wells, near Bramshott, and Emery Down, near Lyndhurst). The

larvae must be collected fairly early in the summer, at least in the localities just mentioned, as by mid-July very few are still feeding. The other two species, *N. aucupariae* Fr. and *N. nylandriella* Tgst., both having green larvae which mine long galleries, appear more difficult to distinguish in their early stages. From a large batch of green larvae, collected in August, 1924, in woods near Penmaenmawr, only a single imago resulted, on May 4th, 1925; much to my surprise, this was a specimen of *nylandriella,* hitherto recorded only from Sutherland and Lancashire, and very little known in this country. A few green larvae, collected in the same district in early September, 1927, produced a single example of *aucupariae* on May 10th, 1928. On examining the mines from Penmaenmawr, I find them to vary greatly as regards the thickness of the frass-line; it is natural to suppose that those with a fine frass-line are mines of *nylandriella,* those with a thick frass-line mines of *aucupariae.* On consulting Mr. N. Grönlien, of Voss, Norway, to whom I am indebted for specimens of mines from his district, I found that he too regarded the mines with a fine frass-line as those of *nylandriella.* Confirmation is, however, desirable. Can any entomologist supply a reliable mine of *nylandriella,* preferably one from which the moth has actually been bred? As for *aucupariae,* it is a widely distributed species. I have it from Merioneth (Dolgelley) as well as Caernarvon, and have found larvae (forming mines with a broad excremental line) in Westmoreland (Ambleside), Oxfordshire (the University Parks, Oxford), Surrey (Hindhead), Sussex (Blackdown), and Hampshire (Waggoners Wells). In the University Parks a larva, undoubtedly of this species, was found on October 26th, 1923, in a leaf of *Cotoneaster frigida.*

N. splendidissimella H.-S.

It is not always easy to separate this species in its early stages from the common *N. aurella* Stt.; for though *aurella* is most partial to ordinary bramble (*Rubus fruticosus*), and *splendidissimella* to raspberry (*R. Idaeus*) and dewberry (*R. caesius*), each may be found on the food-plant of the other. In the second half of October, 1924, larvae were particularly plentiful at Cothill (Berks) on both raspberry and dewberry. Relying on Tutt's statement (British Lepidoptera, I, p. 244) that the egg of *splendidissimella* is laid on the under-surface of the leaf, I carefully sorted out the larvae according to the side on which the egg had been placed; but without avail, for both batches produced imagines of *splendi-*

dissimella. The length and narrowness of the mine of this species are certainly very striking. If straightened out, its total length often attains fully five inches, though restriction of space within the leaf sometimes compresses it into a dense tangle. Its breadth, even at the end of this distance, is hardly more than 1·5 mm., though it terminates in a small oblong blotch of about 2 × 5 mm. (surely not 7 × 5, as Tutt states). The frass is normally deposited in a fine central blackish thread; but sometimes is more scattered, either forming a widened line in which the separate pellets can be distinguished, or spreading (when deposited in a semi-liquid state) into a smudgy line occupying half or more of the gallery. When the frass-line is broad, it is hardly possible to point out any absolute distinction between this mine and the mine of *aurella*. Once the larva has pupated, it is easy to distinguish *splendidissimella* by the olive-green or brownish-olive colour of its cocoon.

N. agrimoniae Fr. (*agrimoniella* H-S.).

The only British locality recorded for this species is Abbot's Wood in Sussex, where it was discovered in 1879 by Mr. W. H. B. Fletcher (see Ent. Mo. Mag., XVIII, 1881-2, p. 211, and Tutt, Brit. Lep., I, p. 314). Does it still occur there? It is satisfactory to be able at last to add a second locality, namely Mickleham in Surrey. On September 30th, 1927, in the course of a brief visit to Mickleham Downs, I found larvae on some plants of *Agrimonia Eupatoria* growing with other herbage on a sheltered grassy bank. The mines of *agrimoniae* begin as narrow galleries with rather thick and irregular central lines of brown frass; later the galleries widen and merge into each other, becoming a broad brown blotch with numerous irregular frass-lines. Thus there is no possibility of confusing them with either the oval yellowish and rather clear blotches of *N. aeneofasciella* H.-S., or the long narrow galleries of *N. fragariella* Hein. (= *aurella* Stt. ?), occurring on the same plant. I therefore collected as many larvae as I could in the few moments available; fortunately they were not scarce, often several in a leaflet. There remained some uncertainty as to whether they might not be merely larvae of *N. arcuatella* H.-S. feeding on an unusual plant. *Arcuatella* was, in fact, common on wild strawberry in the same spot, and its larvae and mines are not readily distinguished from those of *agrimoniae*. All doubt disappeared, however, a fortnight or so later, when the *Agrimonia* larvae all pupated within the leaves. The British species of *Nepticula* which habitually pupate within the leaves are very few (*N. septembrella*

Stt., *N. weaveri* Stt., and perhaps *N. cryptella* Stt.), and include none of those closely related to *agrimoniae*. The leaves were kept out of doors all the winter, and produced nearly thirty handsome specimens of the moth between June 7th and 24th, 1928.

SOME PRACTICAL HINTS.

It may perhaps assist other Lepidopterists if I point out that *N. agrimoniae* and the group of species to which it is closely allied, all having black or blackish forewings with a silvery fascia and white-tipped cilia (*N. atricollis* Stt., *N. rubivora* Wck., *N. angulifasciella* Stt. and *N. arcuatella* H.-S.), require careful treatment if they are to be successfully reared. For their pupation I find it advisable to line the tin in which the leaves containing larvae are placed with a bed of close damp moss, over which fine sand has been sprinkled. The cocoons should not be brought indoors, but should be left exposed to the cold all the winter, and prevented from going dry by occasionally adding a little more moss; they should be brought indoors only when the natural time for emergence is at hand. If brought into warmth early in the year along with the cocoons of other *Nepticulae*, they almost invariably fail, at most one or two moths emerging from a large batch; thus the cocoons of *arcuatella* produced by the Mickleham larvae on *Fragaria* mentioned above were brought indoors in February or early March, and not a single moth resulted from them. By observing the conditions mentioned, I have reared good series, not only of *agrimoniae*, but also of the other four species.

SUPPOSED DOUBLE BROODS.

Many *Nepticulae* reputed to be double-brooded have proved to be definitely single-brooded, so far as my experience goes. Thus *N. oxyacanthella* Stt., *N. basiguttella* Hein., *N. aucupariae* Fr., *N. tiliae* Fr., *N. continuella* Stt., *N. ulmivora* Fologne, and *N. prunetorum* Stt., all of which are still treated as double-brooded in the new edition of Meyrick's 'Handbook,' almost certainly have but one brood (habitually) in this country. The same may be said of *N. atricollis* Stt. and *N. arcuatella* H.-S., both regarded as double-brooded by Tutt, but belonging to a group of single-brooded species. For a number of seasons I have searched constantly for *Nepticulid* larvae, frequenting the same spots and examining repeatedly the same plants, and I feel certain that a summer brood of most of these species would have been detected, if it had occurred. Moreover, many of the records of double broods are based on the finding of larvae in the summer months, or of

empty mines in the autumn; wheras the mere occurrence of early larvae is not adequate evidence of a summer emergence of imagines. The imagines of single-brooded species are apt to emerge at various times between April and August; it is natural that their progeny should also vary in the date of its appearance. There is a very definite difference, in most instances, in the way in which the pupae respond to warmth, those of single-brooded species not producing the perfect insect with anything like the same readiness. I have bred *N. angulifasciella* Stt. and *N. woolhopiella* Stt. down to the end of June, *N. trimaculella* Hw. on July 24th (1924), and *N. ulmivora* Fologne as late as the beginning of September (1923), all from larvae collected the previous autumn, while *N. atricollis* Stt. has been captured in the open on July 2nd (1922), and *angulifasciella* is of normal occurrence throughout July. It must, of course, be remembered that a summer brood may occur in certain districts or certain seasons and not in others (see Tutt's remarks on *N. pomella* Vaugh. and *N. basiguttella* Hein.), or that some pupae of a brood may mature quickly and others remain over (see the remarks on *N. plagicolella* Stt. and *N. acetosae* Stt. in Ent. Mo. Mag., LX, 1924, p. 94), or again that the summer larvae may be few in number and hence overlooked, especially as it is more difficult to detect certain leaf-miners in the height of summer, when herbage is at its densest, than in the autumn. Nevertheless the only acceptable proof that a *Nepticula* is double-brooded is that larvae found in the summer should have produced moths under natural conditions the same season.

184 Woodstock Road, Oxford.
September 20th, 1928.

FOUR NEW BRITISH APHIDES.

BY FRED V. THEOBALD, M.A., V.M.H., F.E.S.

Macrosiphum nigrocampanulae, sp. nov.

Apterous viviparous female. Deep black. Legs yellow except apices of femora, tibiae and tarsi. Frontal lobes large. Antennae black, longer than body; segment I much larger than II, III long, with 120–135 sensoria over its whole length; IV about as long as V, with no sensoria; V with the usual primary; flagellum of VI long. Cephalic hairs simple, antennal hairs partly capitate. Rostrum black, reaching 3rd coxae. Body hairs long. Cornicles long and rather narrow; jet black; large reticulate apical areas, remainder imbricate; slightly swollen at the base. Cauda black, long, pointed, with several long hairs each side, more than half length of cornicles. Eyes large and dark, with large ocular process. Body when cleared with rows of black spots from which the hairs arise and a large black patch at the base of the cornicles and two dark bars behind. Femora and tibiae hairy. Length 3 mm.

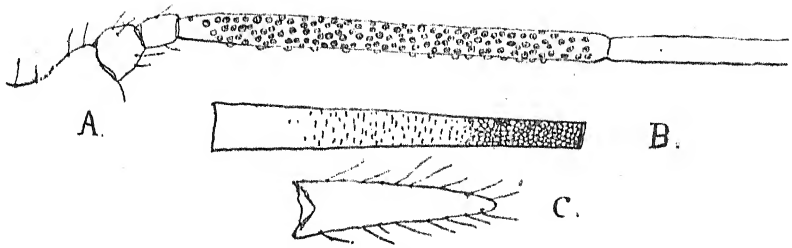


Fig. 1. *Macrosiphum nigrocampanulae*, sp. nov.

Apterous viviparous ♀. A. Head and third antennal segment; B. cornicle; C. cauda.

Alate viviparous female. Deep black, except basal half of femora and basal two-thirds of tibiae which are yellowish. Frontal lobes very large. Antennal segment I much larger than II, III long with 160–170 sensoria all over it, giving a marked tuberculate appearance (remaining segments missing); lateral lobes and antennae with rather short hairs. Cornicles long, thin, cylindrical, more than half as long as antennal segment III; apices reticulate, remainder imbricate. Cauda acuminate, not quite half the length of the cornicles, with numerous hairs each side. Body with rather long hairs. Eyes black, large and projecting, ocular process prominent. Rostrum black, hairy, reaching to or just past second coxae. Legs with hairy femora and tibiae. Wings large; stigma deep yellowish-brown; veins brown. Length 3 mm.

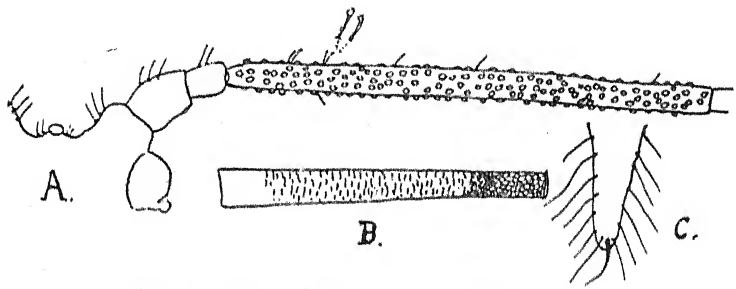


Fig. 2. *Macrosiphum nigrocampanulae*, sp. nov.

Alate ♀. A. Head and third antennal segment; B. cornicle; C. cauda.

Food Plant: Giant Campanula (*Campanula latifolia*).

Locality: Settle, N.W. Yorkshire, viii, 28.

Observations: A large black species found by Mr. Walsh on the Giant Bell Flower or Campanula, which is plentiful around Settle. It resembles at first sight *Macrosiphum compositae* Theob., but differs from that African species in (1) having many more sensoria on segment iii in the apterae, (2) in the longer and narrower cornicles, and (3) in the longer and simple cephalic and body hairs. The apterae occurred in abundance, but only one alate female was sent me, and the apical segments of this were missing.

Rhopalosiphoninus tuberculatus, sp. nov.

Alate viviparous female. Dark; abdomen paler than head and thorax, with darker transverse irregular bars. Cauda and cornicles dark, also antennae and legs, except base of femora and most of the tibiae. Antennae about as long as body; segment I larger than II; III much longer than IV; IV a little longer than V; flagellum long; III with 85–89 sensoria all over it, of irregular size and shape, some round, others oval, with sharp double contours; IV with 34 smaller round sensoria all over it; V with 2+1. Cornicles widely vasiform, stem corrugated, a few striae at apices, about equal in length to segment IV of the antennae. Cauda thick, not so long as cornicles, with four hairs one side, three the other and one apical. Cleared specimens show five irregular dark abdominal transverse bars and short body hairs in transverse lines. Length 2 mm.

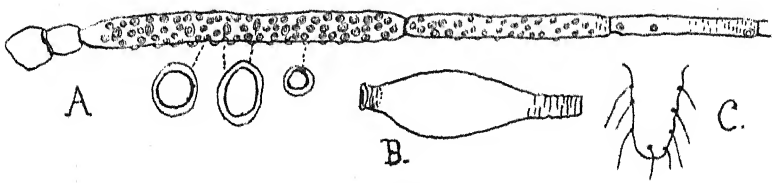


Fig. 3. *Rhopalosiphoninus tuberculatus*, sp. nov.
Alate viviparous ♀. A. Antennae; B. cornicle; C. cauda.

Food Plant: Giant Campanula or Bell Flower (*Campanula latifolia*).

Locality: Settle N.W. Yorkshire, viii, 28 (Walsh).

Observations: Described from one perfect alate female. Several young green larvae were present. It occurred with *M. nigrocampanulae*. It can at once be demarked from other of our *Rhopalosiphoninus* by the much greater number of antennal sensoria, which have a very pronounced double contour and some are markedly oval and larger than others.

Amphorophora digitalisii, sp. nov.

Apterous viviparous female. Bright apple-green; antennae dusky green; apices of segments III and IV dark; V and VI much darker, and imbricate; longer than the body. Segment I larger than II, both with capitate hairs; III longer than IV, with 22–25 round sensoria of varied size, passing on one side nearly to the apex; flagellum moderately long; III to V with simple hairs. Frontal lateral lobes prominent and marked, with some capitate hairs. Eyes large and black. Legs rather long, green, hairy; apices of tibiae and the tarsi black. Cornicles long, swollen on the apical half, green, apices black; as long as antennal segment IV; a few striae at the apices. Cauda thick, sides straight, pale, more than half the length of the cornicles; three hairs one side, four to five the other and one apical. Anal plate green, rounded, with many fine short hairs. Body with scattered capitate hairs, most prominent in front and behind. Length 2·3 mm.

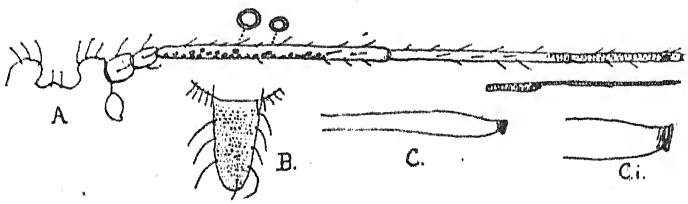


Fig. 4. *Amphorophora digitalisii*, sp. nov.
Alate ♀. A. Head and antennae; B. cauda; C. and C1. cornicles.

Food Plant: Foxglove (*Digitalis purpurea*).

Locality: Falling Foss, 6 miles from Whitby, Yorkshire, 17, vii, 28 (Walsh).

Observations: Described from living apterae sent me by Mr. Walsh. It is a marked *Amphorophora*, distinct from anything I know.

Aphis rumicis Linn., *Anuraphis padi* Linn., and *Myzus persicae* Sulzer are common on wild and cultivated Foxgloves, both *Digitalis purpurea* and *D. lutea*. Walker described two aphides from the Foxglove. One, *Aphis consumpta*, is *A. padi*; the other, *Aphis pilosa*, is apparently distinct, being pale brown and hairy above, pale red beneath, and the black antennae pale red at the base; the legs dull yellow, with black tarsi and tips to the tibiae and femora brown. (Zoologist, vii, 54, App. 1849.)

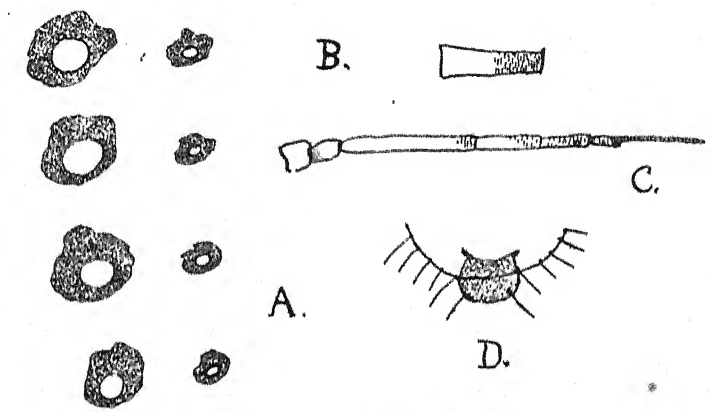


Fig. 5. *Anuraphis petherbridgei*, sp. nov.
Apterous viviparous ♀. A. spiracles and lateral pores; B. cornicle; C. antenna; D. cauda and anal plate.

Anuraphis petherbridgei, sp. nov.

Apterous viviparous female. Small, black, polished and shiny; very active; antennae black, with segment III pale, also base of femora and the tibiae

except their apices. Antennae more than half the length of the body; segment I larger than II; III longer than IV; IV slightly longer than V; base of VI more than half of V; flagellum shorter than III, about as long as IV+V; III to VI imbricate. Rostrum reaching to third coxae. The black cornicles are rather thick, cylindrical, slightly narrowing towards the apices, faintly imbricate. Cauda black, small and blunt, with two hairs each side and one dorso-apical. Anal plate black, with a few hairs. Legs moderately long and thin; tibiae hairy. Eyes black. Cleared specimens show dark areas round the spiracles and some round, clear lateral pores surrounded by dark areas; a dark band caudad of the cornicles and dark anal segment. Body segments with lines of short hairs. Length 1·2–1·5 mm.

Food Plant: Apple.

Locality: Cambridge, vii, 28 (Petherbridge).

Observations: Described from some large colonies found by Mr. Petherbridge on an apple tree in his garden. The insects are under the leaves and produce a certain amount of leaf curling, and are very conspicuous when alive owing to their shiny black colour, small size and active habits..

Wye, *September 4th*, 1928.

DESCRIPTION OF A NEW WHITE FLY PEST OF RHODODENDRONS.

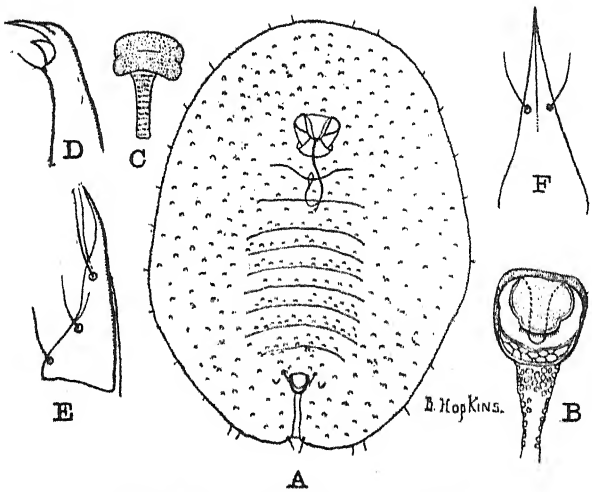
BY F. LAING, M.A., B.SC.

Dialeurodes chittendeni sp. n.

Pupa Case. Transparent white, with the median area partially and irregularly yellowish, flat, somewhat papery in texture, broadly elliptical, devoid of any wax secretion; margin entire, except for a slight indentation at the caudal fold. Prepared specimens show margin finely crenulate, wax-tubes poorly developed, a marginal series, at wide intervals, of strong, stoutish spines, the dorsum presenting a rather close papillate or minutely tuberculate appearance, devoid of spines for one pair, similar to the marginal series, lying anterior to and slightly lateral of the position of the rostral apparatus, and two much more slender pairs, one at the anterior outer angle of the vasiform orifice, the other about the anterior third of caudal fold; vasiform orifice rather small, more or less semi-circular in outline; operculum filling about half and almost entirely obscuring the opening; lingula very small, retracted, scarcely projecting beyond operculum; remainder of orifice almost entirely filled on the lateral and caudal margins by a membrane which appears to be transversely striate. Caudal fold on its basal two-thirds with small roundish cell-like markings; thoracic folds not evident. On ventral surface the rudimentary legs and the rostral apparatus quite distinct. Length 1·26 mm.; breadth 0·92 mm.

Adult. General colour the typical yellow and white prevailing in the family; no barring on abdomen; wings immaculate. Eyes with facets of a uniform size; ocelli conspicuous. Rostrum with apex blunt and rather broad. Tibae of anterior pair of legs with a longitudinal row of 5 stout setae, a similar row of 7 ending some distance from the apex on the mid pair, the hind tibiae with a much closer and finer row of about 20 lying on median area. Operculum of vasiform orifice subquadrate, lingula long, strap-shaped. Female genitalia rather long, slender pointed, side valves with, distally, a pair of very long setae

reaching, but not surpassing, apices, a single submedian, and a basal seta; ovipositor with a long slender seta on either side subapically. Male genitalia with clasper strongly curved at apex, with a marked subapical tooth or hook lying slightly ventrally, anterior to which is a slender seta; penis slender, scarcely recurved, orifice faintly flared. Length 1·38 mm.



Dialeurodes chittendeni Laing, sp. n.

A. Pupa case, dorsal view; B. Vasiform orifice and basal part of caudal fold of pupa case; C. Operculum and lingula of adult; D. Clasper of ♂; E, F. Side valve and ovipositor of ♀.

Locality. Ascot and Sunningdale, on *Rhododendron ponticum* and *R. jacksoni* (received through Mr. F. J. Chittenden, Director of the Royal Horticultural Society's Garden) and from an unknown source (Ministry of Agriculture). Named after Mr. Chittenden as a token of esteem.

I have known of this insect since 1926, when I received a few pupa cases through the Ministry of Agriculture, but it was not until this summer that material satisfactory for descriptive purposes came to hand. The adults bred out have been so few and badly preserved that adequate description will be postponed till a future date. The outbreak at Ascot was so severe that Mr. Chittenden thought it was necessary to issue a warning through the public press and trade papers. The pupa cases were massed on the under surfaces of the leaves and had caused a considerable amount of mottling, while the honey-dew excreted had drenched the upper surfaces of the leaves and provided a matrix for the growth of various sooty moulds consisting of *Dematium pullulans* mainly. It is hoped that the spraying operations carried out under

the supervision of Mr. G. Fox-Wilson will have proved effective in wiping out the attack. Though the species is not typically a *Dialeurodes*, it may conveniently rest in that genus until the classification of the family is better understood.

British Museum (Natural History).

September 1928.

ADDITIONAL NOTES ON THE PROTURA.

BY H. WOMERSLEY, F.E.S.

The European Species of the genus Eosentomon Berlese.

Berlese erected the genus *Eosentomon* for *E. transitorium* in 1908 (1) about a year after the Protura had been first discovered and a single species *Acerentomon doderoi* described by Silvestri (7). In 1912 in his 'Monografia dei Myrientomata' he described a second species, *E. ribagai*, and placed the genus in a separate family, the Eosentomidae. Meanwhile, in 1911, Rimsky-Korsakow (5) described *E. silvestri* from Russia, and in 1912 Prell diagnosed *E. germanicum* and showed that Rimsky-Korsakow's species was co-specific with *transitorium* of Berlese.

The published descriptions, however, of all these three species are very brief and much too indefinite now that this order is becoming better known. Berlese separates his two species by their total dimensions after extension with glacial acetic acid. Prell's species is somewhat more definite, as distinguished by the shorter empodial appendage on the fore tarsus.

Through the kindness of Prof. Balfour-Browne, Dr. Anton Krausse, and Mr. R. S. Bagnall, I have now been able to examine specimens of all three species, and in the following detailed descriptions and notes I have endeavoured to lay stress on certain characters which will facilitate the identification of these insects. In my studies of the species of Protura belonging to the family Acerentomidae (8) I have shown that the ratio of length of foretarsus to fore tarsal claw is constant for a particular species, and this ratio, designated TR, I have used here for the species of *Eosentomon*.

Eosentomon ribagai Berlese.

I have recorded (8) this species as occurring fairly plentifully under deeply embedded stones on the Blackwell Hills, Som., and at Keynsham, Som. My specimens are, as a rule, somewhat smaller than those of Berlese, but agree in their general structure and chaetotaxy, so that I must consider them as referable to his species.

Length (extended) 1,280μ. (Berlese 1,400μ.)
Head 124μ×110μ. (Berlese, length only, 150μ.)
Front legs 316μ, tarsus 96μ, claw 18·5μ, TR=5·1, empodial appendage practically touching tip of claw, clavate tenent hair absent, tarsal setae 27μ.
Middle legs 178μ, claw 14μ.
Hind legs 206μ.
Thoracic stigmata small, 7μ diam.
Abdominal appendages only as long as they are broad at bases, *i.e.* 30μ×30μ.

Eosentomon germanicum Prell.

This is a very distinct species which, while agreeing with the previous one in the arrangement of abdominal tergal setae, is easily known by the structure of the fore tarsus and claw and the other dimensions that I give here. The clavate tenent hair does not appear to be present on any other known species.

On the Continent this species appears to require at least a moderate altitude and might be found in Britain if searched for in the more mountainous districts.

I possess five quite typical specimens sent to me for determination by Dr. Anton Krausse and taken under stones at Eberswalde, Germany. They possess the following dimensions :—

Length (extended) 930μ.
Head 124μ×110μ.
Fore legs 385μ, tarsus 110μ, claw 21μ, TR=5·24, tarsal setae 41μ, empodial appendage only three-quarters of the length of claw, tarsus apically with a long strongly clavate tenent hair reaching quite to or beyond tip of claw.
Middle legs 206μ.
Hind legs 247μ, claw 14μ, setae 25μ.
Thoracic stigmata large and conspicuous, 11μ diam.
Abdominal appendages longer than broad at the base, *i.e.* 50μ×36μ.

Eosentomon transitorium Berlese.

Of a number of Protura taken by Mr. C. B. Williams in peat at Ringwood, Hants, in 1913, I have examined two specimens very kindly lent to me by Prof. Balfour-Browne. Although mounted in balsam, certain details are visible and measurable by which I refer them to this species.

From Berlese's drawings *transitorium* differs from *ribagai* very materially in the setal arrangement of the abdominal tergites. There are only four setae in each row as compared with six in *ribagai* and *germanicum*. The clavate tenent hair on the fore tarsus is absent. An important character is the value of TR, which is only 4.2.

A specimen in Mr. Bagnall's collection of Mr. Williams' taking

may be considered the same species, but it was quite impossible to determine any characters.

The dimensions obtainable from the specimens belonging to the Imperial College of Science are :—

Length (slightly extended), 823μ.
Head, length only, 137μ.
Fore tarsus 87μ, claw 20–21μ, TR=4·2.
Stigmata medium in size, 9μ diam.

The three species at present known from Europe may be separated as follows :—

1. Tarsal ratio greater than 5·0, dorsally abdominal segments with six setae in each row. ..... 2.
   Tarsal ratio 4·2, dorsally abdominal segments with only four setae in each row. Occurs in peat. ..... *E. transitorium* Berl.
2. Tarsal ratio 5·24, tarsus with apical clubbed hair, empodial appendage only three-quarters the length of fore claw. ..... *E. germanicum* Prell
   Tarsal ratio 5·1, tarsus without apical clubbed hair, empodial appendage reaching tip of fore claw. ..... *E. ribagai* Berl.

ON THE PRESENT POSITION OF PROTAPTERON INDICUM SCHEPOTIEFF.

In the Zool. Jahrbucher for 1909 Schepotieff described and figured under the name of *Protapeteron indicum* the only species of Protura that has been said to possess antennae. Borner in 1910 (3) erected a family of the Protura—Protapteridae—for its reception. In 1911, however, Rimsky-Korsakow (5) stated that he had examined a single specimen of Schepotieff's Indian material, and definitely pronounced it to be a typical species of *Eosentomon*, and that the various features by which *Protapteron* differed from *Eosentomon* were non-existent.

After having collected and studied a large number of Protura of many species, I am very doubtful whether Rimsky-Korsakow's statement should have been accepted so definitely as it has been.

While undoubtedly one of the specimens brought back from India by Schepotieff, there would appear to be no doubt that it was *not* the actual type described as *Protapteron* and in all probability was not even a co-type. It seems to me that Schepotieff quite possibly had at least two species in his collection. I myself have on many occasions taken more than one species under the same stone, and it is absolutely necessary to examine each specimen microscopically before accepting it as the same as another. Unfortunately, however, it does not appear possible to trace the actual type of *Protapteron*, and we must rely on Schepotieff's paper and figures. If my view is correct, then we have two distinct species known from India, *Protapteron indicum* Schepf. and

Eosentomon indicum R-Kw. Apart from the presence of antennae, *Protapteron* as figured shows many points of difference from *Eosentomon*.

In all known genera of Protura the claw on the fore tarsus is characteristic of the particular genus and in the majority it differs from those on the other tarsi. In *Acerentomon* and *Acerentulus* it is straight for about three-quarters of its length and then curves. In *Eosentomon* it is very much like an elongated S. In the Merentominae, however, it is evenly curved, as on the middle and hind tarsi, and in this resembles those figured for *Protapteron*.

Further, the fore tarsi of all known species, other than Schepotieff's, possess numerous and varied sensillae which themselves are to some extent of generic value. Nothing of this nature is mentioned or shown by Schepotieff and their lack may perhaps be correlated with the presence of antennae. The two large and broad spines are evidently not of this nature.

Rimsky-Korsakow lays stress on the supposed erroneous fourth abdominal appendage, but these are (to my mind) similar to those on the second and third abdominal segments in *Acerentulus* and *Acerentomon* and on the third in *Parentomon*, and other species may yet be discovered possessing more than three pairs of these primitive organs.

In the mouth parts and genital opening *Protapteron* also differs from *Eosentomon*, but from these remarks it will be seen that it is very much open to question whether Rimsky-Korsakow really had a typical *Protapteron* before him. The question, however, will only be settled on production of the actual type or the rediscovery of *Protapteron*.

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Sunny Meads, West Town, Somerset.
August 10th, 1928.

Notes on Erythroneura parvula Boh. : a correction.—Owing to an unfortunate oversight in 'making up' Plate II in the September No. of this Magazine, the explanations of the respective figures does not agree with the numbers attached to them. The explanation of the Plate should therefore read as follows :—

Fig. 1. *Primula forrestii* affected by *Erythroneura parvula*, upper surface of leaf, ×10.
,, 2. 2 eggs of *Erythroneura parvula* in vein of *Primula effusa*, ×40.
,, 3. Last larval instar, ×28.
,, 4. *Erythroneura parvula* ♀, terminal abdominal segment, ×80.
,, 5. *Primula effusa* affected by *Erythroneura parvula*.
,, 6. *Erythroneura parvula* ♂, terminal abdominal segment, ×80.

—Eds.

Helophorus nanus Sturm in Bedfordshire.—This species occurred in great profusion in a very small pond at Chiltern Green during March of this year. Scraping the banks and stirring the mud on the bottom with the water-net caused the beetles to float on the surface from whence they were easily skimmed. Examination of a large number of specimens showed it to be a very variable species, both in size and in colour, ranging from pale testaceous with a black dorsal mark, through brown to almost black. It was accompanied by *H. affinis* Marsh., *Octhebius impressus* Marsh., and *Limnebius papposus* Muls. The absence in the pond of the ubiquitous *H. brevipalpis* Bed. was very noticeable. On some of the specimens of *H. affinis* could be seen a brilliant red patch on one of the elytra : lifting the elytron revealed the fact that this was due to the presence of one or more mites, whose bright colouring shewed very plainly through the transparency of the chitin. In a few cases where two mites were present; they were lying close together and touching each other, the effect of this being to increase the extent of the red patch. It would be very interesting to learn if any other Coleopterists have met with similar cases, and if any explanation of the presence of the mites can be given.—B. S. Williams, 15 Kingcroft Road, Harpenden : *September 20th*, 1928.

Aphodius lividus Ol. at Harpenden.—In 1924, my friend Mr. P. Harwood discovered that this scarce species occurred in the Harpenden district by the capture of a single specimen in a manure heap. In 1925 I took two more examples in the same heap, and though I have made a number of attempts to meet with the species again (with the exception of a single specimen taken in another manure heap by Professor Sir T. Hudson Beare) it did not turn up until this month. On the 8th Sir Thomas and I found it in a third heap about three-quarters of a mile away from the spot in which Mr. Harwood's original capture was made. By making two trips we both managed to complete our series. *A. lividus* seems to shew a preference for the portion of the heap where the dry outer layer meets the inner moist part. It seems to be an erratic species to find, as one may sift on steadily for an hour or more without finding a specimen, then come across a handful containing two or even more. Judging from the occurrence of an immature specimen and a pupa (that is almost certainly of this beetle), it would appear that *A. lividus* is an early autumn species.—B. S. Williams : *September 20th*, 1928.

[This interesting little Scarabaeid, although decidedly uncommon as a British species—in all my collecting at home I have taken it singly on two occasions only, at Stockbury, Kent, August 1886, and at Kirtlington, Oxon., September 16th, 1912—is almost cosmopolitan in its distribution. I have found it plentiful

throughout the Mediterranean region, as well as in China, and in Australia it is perhaps the commonest species of its genus, and occurs in all kinds of stercoraceous deposits; while I have met with it freely in New Caledonia, and less frequently in the New Hebrides (Ent. Mo. Mag., XXXVIII, pp. 193–198). Its range extends to the Hawaiian Archipelago, where it is common all over the islands (Blackburn and Sharp, Scientific Trans. Royal Dublin Society, Ser. 2, Vol. III, p. 238), but apparently has not yet reached New Zealand, though our familiar *A. granarius* L. is there the commonest of the very few dung-frequenting beetles, all without exception introduced from other countries. —J. J. Walker.]

Cryphalus asperatus Gyll. at Bricket Wood.—Early in the year Mr. G. H. Ashe sent me a piece of aspen containing this species. Having thus become familiar with the appearance of the wood when tenanted by the *Cryphalus*, I resolved to search for it when next at Bricket Wood, where the aspen grows profusely. On May 21st of this year my friend Mr. F. H. Day and I had a day's collecting there, and after a short search found the beetle not uncommonly, both in the pupa and adult stage.—B. S. Williams: *September 20th*, 1928.

Phytodecta pallida L. in Cumberland.—On September 13th last I beat a single specimen of this beetle from a small spruce fir near Sebergham. The species, I believe, feeds on hazel (*vide* Donisthorpe, Ent. Rec., 1909, p. 208), but although this was abundant in the locality, I was unable to find it on any of the bushes I spent some time in searching and beating. Possibly at this late date the species had gone into hibernation, indeed the fact that this specimen came from a coniferous tree, in which various insects, Hemiptera at any rate, are to be found in winter, rather suggests it had gone into winter quarters.

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Elater nigrinus Pk. in the North of England.—Early in July, while beating various trees and bushes for insects, I captured a single specimen of this species from birch. This was in the Gelt Woods in Cumberland, a locality which has been fairly well worked for Coleoptera, but this is the first time the *Elater* has occurred there, so apparently it is rare. Except for the two records given by Fowler from England, *viz.*:—Tooting Common and Burnt Wood, Staffs. (both old ones), the species appears to be mainly a Scotch one, and the present record links up in a small way the areas of its range in Britain.—F. H. Day: *September 17th*, 1928.

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a fairly large sheet of stagnant water. I am indebted to my friend for finally determining the species, he having the good fortune to possess one of Mr. Harwood's original captures with which to compare his own.

The following species are not included in the list of Coleoptera in Morey's 'Natural History of the Isle of Wight,' and do not appear to have been subsequently recorded. *Apion waltoni* Steph. (Sandown, vi.'27), *Apion marchicum* Hbst. (at foot of cliff, Sandown, vi.'28).

The record for *Limnobaris t-album* L. is an old one, possibly applying to *L. pilistriata* Steph., which has occurred elsewhere in the Island. *L. t-album* was plentiful at Bembridge, both this year and in 1927.—J. L. HENDERSON, 6 Haydn Avenue, Purley, Surrey: *September 8th*, 1928.

Colias croceus Fourc. and other migrant Lepidoptera at Hastings.—It is many years since I have seen *C. croceus* as numerous as it was on several occasions when I visited Ecclesbourne and Fairlight Glens, near Hastings, during my holiday at the end of August last, when it outnumbered the 'whites' completely. The most attractive flowers were ragwort (*Senecio Jacobaea*) and fleabane (*Inula dysenterica*), which latter plant was locally plentiful. The protective colouration of both the upper- and under-sides of the *Colias* when alighting on these flowers was very evident. Only one var. ♀ *helice* was seen and duly captured. *Pyrameis cardui* L. and *P. atalanta* L. were also much in evidence, the former being decidedly the commoner of the two. *Plusia gamma* L. and *Nomophila noctuella* Schiff. often got up at one's feet in walking through the rough herbage.—A. H. HAMM, 22 Southfield Road, Oxford: *September 23rd*, 1928.

Colias croceus in Hertfordshire.—On September 21st I observed this insect on four occasions during the afternoon on Berkhampstead Common. It is not possible to say whether only a single individual was present which kept within a relatively small area of ground, or whether there were several examples. The sex represented was the male.—A. D. IMMS, Rothamsted Experimental Station, Harpenden: *September 22nd*, 1928.

Another Cumberland locality for Corixa dentipes Th.—On returning to England for a few weeks I examined the specimens standing in my collection as *Corixa geoffroyi* Leach and discovered among them a single ♂ *C. dentipes* taken at Whin's Pond, Edenhall, Cumberland, 27.viii'21. Whin's Pond is a large sheet of water containing much vegetation. Contrary to Mr. F. H. Day's experience (E.M M. LXIV, p. 158, 1928) *C. geoffroyi* was taken at the same time as *C. dentipes*.—G. E. HUTCHINSON, The Lodge, Pembroke College, Cambridge: *August 27th*, 1928.

Dicyphus errans Wolff and other Capsidae on potatoes in Kent.—During August and early September nymphae of *D. errans* Wolff were to be found in large numbers on potatoes in various localities near Maidstone. They were taken in all their nymphal instars, and were easily reared to maturity on potato leaves—*Dicyphus* is one of the most easily reared genera of Capsids. The nymph is elongate-ovate, becoming more and more elongate at each moult. It is of a deeper green than the nymph of *D. epilobii* Reut., so common on willow-herb, and is characterised by the dark reddish-brown basal joint of the antennae, and by the conspicuous dark eyes.

Butler (Biol. Brit. Hemipt.—Heteropt., 1923) does not give the potato as a host plant of *D. errans*, but mentions nettles, chamomile (*Anthemis*), woundwort (*Stachys*), willow-herb (*Epilobium*), figwort (*Scrophularia*), crane's bill (*Geranium*), stork's bill (*Erodium*), *Paulownia*, *Volkameria*, and alder (*Alnus*).

Other Capsidae found commonly in the nymphal stages on potatoes this year included *Lygus pabulinus* L. and *L. pratensis* L. *L. pratensis* was not, up to September at any rate, found in such large numbers as had been observed in previous years.

L. pabulinus, as recently pointed out by Petherbridge and Thorpe (Annals of Applied Biology, XV, pp. 446–472, August 1928), has two generations per annum. The spring generation feeds on apple, black and red currant, gooseberry, etc., and when mature migrates to potatoes, nettles, etc., to lay eggs. The summer generation, after feeding and maturing on potatoes and other herbaceous plants, returns to the spring host to lay winter eggs in woody tissue. In Kent the hop also would seem to be a summer host, though not perhaps to quite such a large extent as is the potato. In some hop gardens this Capsid caused a great deal of puncturing of the leaves during the latter half of July and in August, and nymphs in all stages were found.

The migration from the hops seemed to begin this year during early September (*i.e.* when hop-picking had begun). In the case of one hop garden under observation, the Capsids did not return immediately to apples, currants, etc., but went on to some runner beans (*Phaseolus*) in the vicinity. Their object was, presumably, to feed on the sappy tissue of the bean plants until they were ready to lay their winter eggs.—W. Steer, Research Station, East Malling, Kent: *September 7th*, 1928.

Obituary.

Francis Cardew Woodforde, B.A., F.E.S., died on July 17th, after a long period of failing health, at Headington, Oxon. The Rev. James Woodforde, whose 'Diary of a Country Parson,' with its quaint and minute details of the social life of more than a century ago, was received with so much interest on its publication in 1926, was his great-uncle; and his father, Dr. F. H. Woodforde, of Taunton, Somerset, was in his day a well-known naturalist, who formed a very fine collection of the birds of the county, which included many rare species, and was presented to the Oxford University Museum by the subject of this memoir. Woodforde was born at Taunton on November 13th, 1846, and educated at the College in his native town; at the age of eighteen he won a demyship at Magdalen College, Oxford. This he very generously gave up in favour of a man in less affluent circumstances than himself, and proceeded to Exeter College, taking his degree in Natural Science in 1868. Disappointed in his wish to adopt the profession of medicine, he devoted himself to teaching, and in 1882 he became Head Master of the old Grammar School at Market Drayton, Staffs., and retained this post until his resignation in 1909: though during the Great War his strong patriotic feeling led him to resume his school-work in order to liberate a younger man for service.

From an early age he displayed a keen interest in all branches of Natural History, and for many years he was well known as one of the most energetic and successful collectors of Lepidoptera in the Midland counties. Very few if any entomologists had so intimate an acquaintance with the rich insect fauna

of the Burnt Woods, Chartley Moss, Wyre Forest, Cannock Chase, and other localities within easy reach of Market Drayton, and in his vacations he went farther afield to North Wales, Cornwall, the New Forest and Scotland. He thus formed, with the aid of his numerous friends and correspondents, one of the finest and most complete collections of British Lepidoptera of the period, which was disposed of by him at Stevens's a year or two before he finally left Market Drayton.

Woodforde made Oxford his headquarters in 1910, and at the instance of Prof. E. B. Poulton he undertook the onerous and highly desirable task of putting into order the great collection of British Lepidoptera in the University Museum in accordance with modern ideas of arrangement and labelling, as well as dealing with a very large number of specimens from various sources which awaited incorporation into the general series. Up to within a year of his death he devoted practically the whole of his time to this work, except during the summer months, when he made prolonged and successful visits to some of his old hunting-grounds, the valuable results of these trips being handed over to the Museum. It was during one of these visits to North Cornwall in 1911 that he found the then very rare diurnal cockchafer *Rhizotrogus ochraceus* flying in abundance, and was able to supply many of our collections of Coleoptera with this desideratum. Also in 1921 and the following year he spent the summer with a married daughter at Passavant, an almost unworked locality in Eastern France; the very interesting results of these two visits are detailed in our Magazine for 1923 (Vol. LIX, pp. 61–64).

Before his last illness he had completed the arrangement of the British Lepidoptera in the University Museum to the end of the Crambites, several important collections having been acquired by bequest or otherwise and incorporated while the work was in progress. The net result is a series of our native butterflies and moths which for extent, completeness, and above all for the copious and accurate data attached to nearly every individual insect, is probably unrivalled at the present time. The richness of this great collection is well shown in the comprehensive account from Woodforde's pen in the pages of the 'Entomologist,' Vols. LIV, LV, and Vol. LVIII, pp. 177–180; at the date of the latter article (August 1925) the number of arranged specimens amounted to no fewer than 42,000. The disinterested labours of the subject of this notice will not fail to be appreciated by every Entomologist who may have occasion in the future to consult the University Museum collections.

In his younger days Woodforde was an excellent shot with the rifle, and a keen Volunteer, holding the rank of Captain in two corps in succession. Next to Entomology, his chief delight was in fly-fishing, and he also took much interest in the geology of Staffordshire. One of the kindest and most generous of collectors, he was ever ready with information or specimens for his fellow-workers, and his varied knowledge and quiet humour made him a most pleasant colleague. In later life he was much handicapped by progressive deafness, and for some months previous to his decease he was partially paralysed and bedridden. The end came very peacefully, and he was followed to his last resting-place at Headington Cemetery by the Hope Professor of Zoology and the writer of this notice.

He married a distant cousin in 1874, and we are greatly indebted to one of his surviving daughters, Mrs. P. M. Scott, of Sherborne St. John, Basingstoke, for valuable assistance in the preparation of this memoir.—J.J.W.

BIOLOGICAL OBSERVATIONS ON BRITISH PSOCOPTERA.

BY J. V. PEARMAN, F.E.S.

(*Continued from p.* 218.)

II. Hatching and Ecdysis.

Hatching has been watched from start to finish in the species *Graphopsocus cruciatus* (L.) *Mesopsocus unipunctatus* (Mull.) and *Psocus longicornis* (Fabr.), and less completely in a number of other species. The notes of those observations have been compared with the accounts of Hubbard [6], Peyerimhoff [12], Huie [7] and Wachter [16].

In the Psocoptera the two distinct stages comprehended in insect hatching—(*a*) rupture of the chorion and extrusion of the embryo, (*b*) rupture and shedding of the embryonic cuticle (prelarval moult)—are particularly well-marked.

First Stage: emergence of the embryo. The mature embryo lies on its back, slightly curved with its hind end turned up (ventrad) and its head bowed, so that the mouth is pressed down towards the anterior coxae; antennae, palpi and legs are closely applied to the venter (a good figure is given by Huie). Removed from the shell immediately prior to hatching, it appears as a smooth, oval, almost featureless object enclosed in a fine structureless sheath. Although the sheath seems to form a simple sac, on soaking the embryo in acetic acid the limbs and appendages are extended, and it is seen that they—even also the hairs—are separately encased. Whatever its origin, it will be preferable to refer to the enveloping membrane as the embryonic cuticle rather than as the amnion, although it should be noted that the embryonic exuviae exhibit no trace of casts of the mouth parts.

The epicranial region of the head of the hatching Psocid is relatively large and globose. Above the frons, developed externally on the embryonic cuticle, lies the 'egg-burster,' for which, in default of a better designation, I use the term *oviruptor*. It extends from about the eye level to the posterior border of the clypeus, and in the majority of species is in the form of a broad-backed, curved knife, its cutting edge either plain or serrate or deeply dentate. The lower end of the oviruptor is hinged to two rib-like thickenings of the embryonic cuticle, diverging obliquely to the sides of the head; these ribs—referred to as the *brachia*—are in some species coarsely toothed.*

* In the embryo the transparent divergent ribs are not plainly discernible. The structure of the oviruptor has had to be studied from the embryonic exuviae.

The oviruptor is operated by the rhythmical bubble-like extrusion and retraction of a small underlying area of the head capsule (pulsatory area), situated about the middle of the frons, whereby the free end is alternately raised and lowered, while the hinged end, restrained by the brachia, serves as a pivot to transmute the thrusting into a rocking or cutting motion. Dilatation of the pulsatory area appears to be due to blood pressure, set up by strong abdominal contractions, but the subsequent deep depression suggests compensating action by muscles within the head. The pressure is strong and sustained, the rhythm in general slow, with a diastole period of six seconds and a systole of two seconds. At the same time the labrum is vigorously flapped, perhaps thereby aiding the work through the brachia, and air is swallowed appearing as bubbles in the alimentary tract.

By strong muscular exertion the 'tail' is straightened and the body elongated, thus keeping the head pressed against the inner wall of the chorion, enabling the oviruptor to cut a slit in the apical third of the dorsal aspect of the egg, through which the nascent Psocid slowly glides upright. The embryo issues smoothly and steadily. The method of propulsion is difficult to make out, but seems to be a combination of lengthening or pushing efforts with variations in the internal blood pressure or expansion. It is obvious that strenuous exertions are being made, and the pulsatory area of the head at times throbs more rapidly, to be followed by short intervals of apparent quiescence. The first stage ends with the embryo coming to rest erect with its hinder part still in the egg, grasped by the slit chorion.

Second Stage: pre-larval moult. Often a short pause precedes the second stage, but sometimes the preliminary efforts to shed the embryonic cuticle will commence before emergence has ceased.

There is first a strong bending forward, in which the back of the thorax is roundly arched, and the head almost touches the egg-shell. The head pulsations are renewed and the intestinal motion is intensified. Presently the hump-strained cuticle gives way, slitting from behind the head to the oviruptor, and begins to wrinkle down the cheeks. The first indication of the shedding of the fine transparent cuticle is the freeing of the eyes, which, hitherto appearing as mere dark spots, now assume their globular facetted form. As the antennae begin to pull out, the insect resumes the upright position and sways on its base; then it bends backwards more and more, freeing each pair of legs in turn, until the little creature lies almost horizontally, back downwards, jerkily

kicking its legs and waving its antennae. By this last manoeuvre, adhesions of the still moist limbs are avoided, a matter of vital importance. Once more it comes back to the upright position, bends over, grasps the egg-shell with its claws, pulls clear the remaining imprisoned portion of its abdomen and rests, while its strained and elongated body subsides into its proper portions. The embryonic cuticle is left projecting from the exit, a crumpled shred ending in a stiff triangle where the brachia of the oviruptor keep the membrane tightly stretched.

From the rupture of the chorion to complete freedom the time taken averages about forty minutes, nearly equally divided between each stage. Some individuals need a longer time, but the 'many hours' and 'several days' of Hubbard's account are surely errors induced by discontinuous observations.

Of the four accounts referred to, only that of Peyerimhoff explicitly attributes the movements of the pulsatory area (hernie) to blood pressure, but all stress the swallowing of air which is considered to assist in the rupturing of the embryonic cuticle by increasing the pressure from within. Although it is not to be doubted that the gulped air, by preventing the collapse of the intestine, would help to maintain pressure set up by muscular action on the fluid contents of the body, its importance may have been over-emphasised, notwithstanding the evidence brought forward by Knab [18]. Since the presence of air is manifested by bubbles, it is evident that the alimentary tract contains liquid, and my observations indicate that the quantity of air swallowed may vary individually. Moreover, a careful and special observation made during the first stage of emergence showed that what appeared to be a succession of bubbles entering by the mouth was actually a chain of bubbles moving rapidly up and down the anterior portion of the alimentary canal.

Howard failed to detect the oviruptor, Wachter alone appears to have noticed the brachia. The latter thought that the movements of the oviruptor might help to free the embryo by pressure on the inflated body, apparently giving rise to the tear. As will be seen by comparison with what occurs at ecdysis, such a function for the oviruptor need not be assumed.

The oviruptor, which is more firmly attached to the cuticle than Peyerimhoff suggests, varies as regards the cutting edge in the different genera. Curiously enough, it is paler and more delicate looking in those cases where there is an additional cemented egg-coat to be cut through than in those where the chorion alone has

to be slit. In *Ectopsocus* and *Graphopsocus* it is dark and deeply dentate or pectinate; in *Caecilius* and *Mesopsocus* it bears numerous small teeth or spines; in *Elipsocus* and *Peripsocus* it is knife-edged; in *Pterodela* it is sharp edged with a large median notch or tooth. It is remarkably lengthened in *Stenopsocus*, with a long free shaft extending over the abdomen of the embryo. That of the genus *Psocus* is much modified, being flattened, and having a transverse saw medically; in this genus the chorion, instead of being slit longtitudinally, is cut so that a hinged flap is formed. I hope to give figures of some of the various types of oviruptor at a later date.

Behind the eye of the hatching Psocid can be seen in some species a reticulate marking lying below the skin, and apparently made up of rows of dark pigment granules. This marking, which suggests the presence of some special organ, disappears later.

Ecdysis is an almost exact repetition of the second stage of hatching. The young psocid becomes inert, and has a sick appearance. After a while, it commences to elongate and retract its neck and abdomen regularly and fairly rapidly. Pulsation of the head capsule is set up at three points, one in the middle of the frons as at hatching, and two others on the epicranium a little inward from the eyes.*

The back is arched, the thorax raised, the head and the abdominal apex bent downwards; the old skin ruptures behind the head and the insect, still arched, strains upward from the rent, the limbs and abdomen sliding evenly within the ensheathing integument. When the head is freed, the insect straightens itself and rears upright on its tail, while the legs and appendages are being drawn out, and in the early instars there is often a pronounced backward bending. After remaining poised erect for a few minutes while the legs are exercised and harden, the insect drops to its feet, pulls free the tip of its abdomen, and excretes a drop of fluid. During the whole proceeding the head pulsations and abdominal pumping continue with waxing and waning vigour.

On the completion of the last moult, the wings are at first no larger than those of the nymph but are softer, fleshy-looking and wrinkled costally, and hang limply down. When they begin to expand and harden, from the base outwards, the forewings are raised, and bend back upon themselves, so that the apex lies above the shoulders; or the bending is reversed (*Psocus sexpunctatus*,

* The absence of the two latter pulsatory areas during the pre-larval moult has not been definitely established. On the head of the imago in some species flattenings or depressions mark the sites and extent of the epicranial pulsatory areas, e.g. they are particularly evident in the male of *Mesopsocus unipunctatus*.

Caecilius flavidus), the wing tip turning under towards the axillae. As hardening proceeds, the wings gradually straighten out, and are slowly brought to the normal resting position, but even when perfectly formed the apex of the forewing remains for some time still slightly curved.

The moults are accomplished usually in from thirty to forty minutes.

There appear to be six pre-imaginal instars. This estimate has been arrived at by carefully collecting the exuviae of a known number of insects and checking the count by comparing the actual time taken to complete development with the ascertained average interval between successive moults. It has been possible to do this reasonably satisfactorily only in the case of *Psocus sexpunctatus*, thus :—

Eggs hatched May 22–23.

One larva caged separately, moulted June 2, 11, 21; average interval 10 days. (Died June 23.)

Three other larvae reared to maturity in one cage; 18 exuviae collected.

Remaining larvae reared together.

Imagines appeared July 16–17; total period of development 55–56 days. (Estimated period 60 days.)

There was evidently a quickening of development in one instar, possibly the last.

Takahashi [15] states that the larva of the Japenese *Amphigerontia kolbei* End. moults more than eight times. Weber [17] recognised only three immature stages in *Nymphopsocus* (*Ocellataria*) *gravinympha*, but this estimate is obviously too low, as are also those of Kolbe [Mon.] four moults, and Tillyard [Mon.] four instars.

The successive instars show gradual and almost imperceptible changes; whether there is any justification for the recognition of distinct larval and nymphal (pseudo-pupal) conditions must be settled by future investigations.

It is noteworthy that Psocid hatching is markedly similar to that of Aphids, of which latter an interesting account is given by Gimingham [19].

ADDITIONAL REFERENCES.

(For other references see pp. 217–8 *ante*.)

18 KNAB, F. Role of air in ecdysis. 1909. Proc. Ent. Soc. Wash., XI, p. 68.

19 GIMINGHAM, C. T. On . . . eggburster in Aphid. 1925. Trans. Ent. Soc. Lond., p. 585.

(To be continued.)

32 Cornwallis Crescent, Clifton, Bristol.

September 1928.

ON THE ORIENTAL SPECIES OF THE *LITHOCHARIS OCHRACEA* GROUP OF STAPHYLINIDAE (Col.).

BY MALCOLM CAMERON, M.B., R.N., F.E.S.

This group is abundant in the Oriental region, and four species are at present referred to it, *ochracea* Gr. *vilis* Kr., *fuscipennis* Kr., and *carinatus* Cam., the insects described by Kraatz as *nigriceps* and *sororcula*, having been wrongly sunk as synonyms of *ochracea* and *vilis* respectively. Not only must these be given specific rank again, but several more species are readily recognised by examination of the secondary ♂ characters, the females, however, are very difficult to separate.

The following Table is based on the ♂ characters:

1. 6th ventral segment on each side of the excision with a flat brush of yellow pubescence. ..... 2.
   6th ventral segment without such structure. ..... 3.
2. The pectinate area of the 5th ventral segment feebly emarginate, broader, the teeth finer and on each side with several long black hairs: the brush of yellow pubescence on the 6th segment longer and more developed, the excision broad, deep and arcuate. Fig. 1.
   (Europe. Zanzibar. Mauritius. India. Jamaica. Probably cosmopolitan.) ..... *ochracea* Gr.
   The pectinate area of the 5th ventral segment rounded, usually feebly emarginate in the middle, narrower, the teeth coarser, without long black hairs at the side: the brush of yellow pubescence on the 6th segment shorter, less developed, the excision obtuse. Fig. 2.
   (India: Dehra Dun. Malay Peninsula: Pahang, Singapore. South China: Sheung Shui.) ..... *penicillata* n. sp.

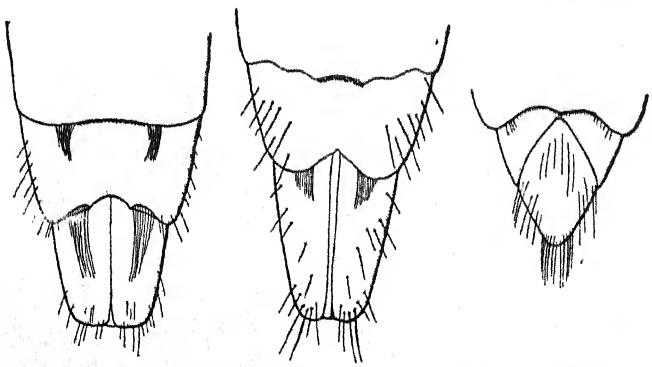

Fig. 1. *L. ochracea*. Plymouth. Fig. 2. *L. penicillata* n. sp. Keppel Harbour, Singapore. Fig. 3. *L. fuscipennis*.

3 5th ventral segment with a comb of black teeth at the middle of the posterior margin. ..... 4.

5th ventral segment without such structure. ..... 11.

4. Pectinate area of the 5th ventral segment more or less emarginate or truncate. ..... 5.

Pectinate area of 5th ventral segment obtusely produced in the middle, arcuately emarginate on each side. Fig. 3.

(Ceylon, Malay Peninsula, Selangor) ..... *fuscipennis* Kr.

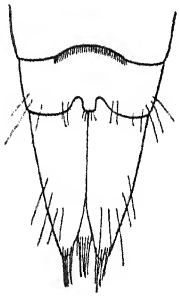

Fig. 4. *L. lamellifer.* Chakrata District.

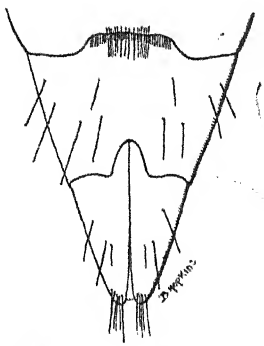

Fig. 5. *L. sororcula.*

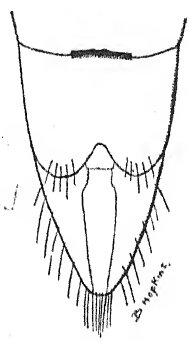

Fig. 6. *L. sordida.* Bentong.

5. 6th ventral segment in the middle with a little quadrate lobe, on each side deeply, arcuately emarginate. Fig. 4.

(India: United Provinces, Saiya.) ..... *lamellifer* n. sp.

6th ventral segment simply excised. ..... 6.

6. 5th ventral segment with long black setae mixed with the usual pectinations: 6th segment deeply, subacutely excised. Fig. 5.

(Ceylon. India: Dehra Dun, Siwaliks. Singapore. West Indies: Grenada.) ..... *sororcula* Kr.

5th ventral segment without long black setae amongst the pectinations. . 7.

7. 6th ventral segment with deep, narrow median excision, the apex rounded. Fig. 6.

(Malay Peninsula. Pahang.) ..... *sordida* n. sp.

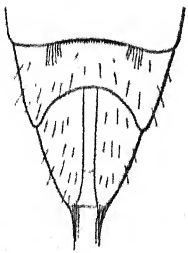

Fig. 7. *L. nigriceps.* Keppel Harbour, Singapore.

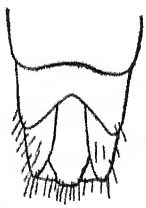

Fig. 8. *L. carinatus.* Fort de Kock.

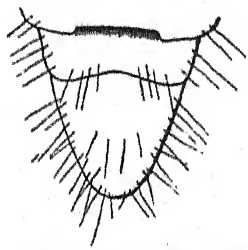

Fig. 9. *L. distinguenda.* Singapore.

6th ventral segment with broad, obtuse or rounded excision. ..... 8.

8. 5th ventral segment on each side of the pectinate area with long black setae. Fig. 7.

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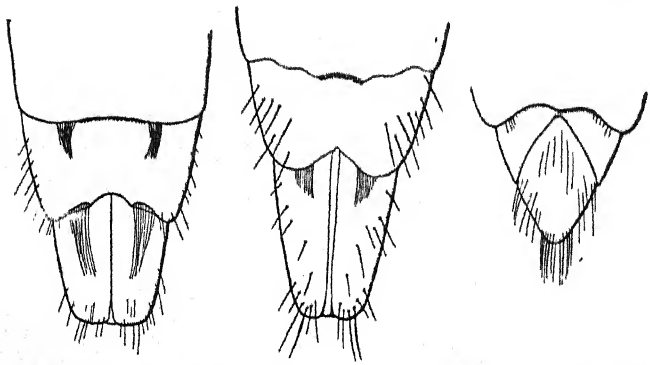

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Pectinate area of 5th ventral segment obtusely produced in the middle, arcuately emarginate on each side. Fig. 3.

(Ceylon, Malay Peninsula, Selangor) ..... *fuscipennis* Kr.

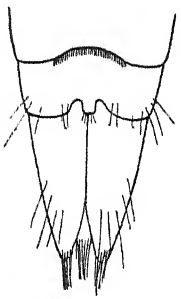


Fig. 4. *L. lamellifer.* Chakrata District.

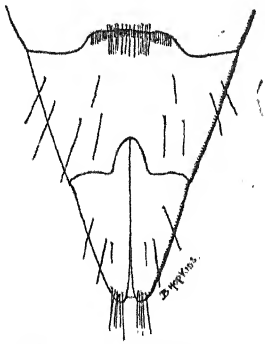
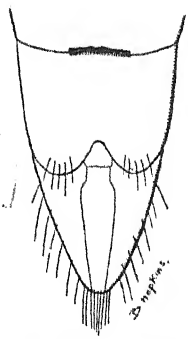


Fig. 5. *L. sororcula.*



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(Ceylon. India: Dehra Dun, Siwaliks. Singapore. West Indies: Grenada.) ..... *sororcula* Kr.

5th ventral segment without long black setae amongst the pectinations. . 7.

7. 6th ventral segment with deep, narrow median excision, the apex rounded. Fig. 6.

(Malay Peninsula. Pahang.) ..... *sordida* n. sp.

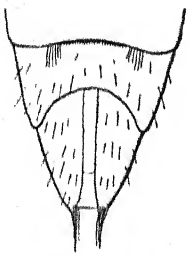

Fig. 7. *L. nigriceps.* Keppel Harbour, Singapore.

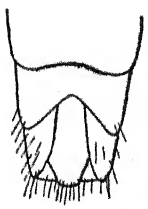

Fig. 8. *L. carinatus.* Fort de Kock.

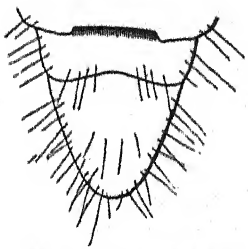

Fig. 9. *L. distinguenda.* Singapore.

6th ventral segment with broad, obtuse or rounded excision. ..... 8.

8. 5th ventral segment on each side of the pectinate area with long black setae. Fig. 7.

(Ceylon. India: Pusa, Simla Hills. Sumatra. Singapore. South China.) ..... *nigriceps* Kr.

5th ventral segment without such setae. ..... 9.

9. Excision of the 6th ventral segment rectangular; teeth of the comb on 5th segment very fine. Fig 8.
(Sumatra.) ..... *carinatus* Cam.

Excision of the 6th ventral segment obtuse or rounded; teeth of the comb stouter. ..... 10.

10. 5th ventral segment with the pectinate region truncate, the teeth stout: 6th ventral segment with the excision broad, shallow and rounded. Fig. 9.
(Singapore. Federated Malay States: Selangor. North Borneo; Sandakan.) ..... *distinguenda* n. sp.

5th ventral segment with the pectinate region slightly emarginate, the teeth less stout: 6th ventral segment with deeper excision. Fig. 10.
(Ceylon. Singapore. Penang. Samoa.) ..... *vilis* Kr.

11. 5th ventral segment along the middle of the posterior margin truncate, narrowly black, without trace of teeth: 6th ventral segment broadly, deeply semi-circularly excised. Fig. 11.
(Timor: Dilli. Singapore.) ..... *timorensis* n. sp.

5th ventral segment at the middle of the posterior margin broadly emarginate, without trace of pigment and fringed with fine, long black hairs: 6th ventral segment with deep subacute triangular emargination with apex rounded. Fig. 12.
(Sumatra: Fort de Kock.) ..... *jacobsoni* n. sp.

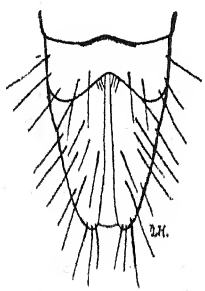

Fig. 10. *L. vilis.* Fort de Kock.

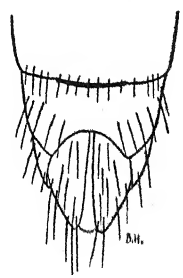

Fig. 11. *L. timorensis.* Timor

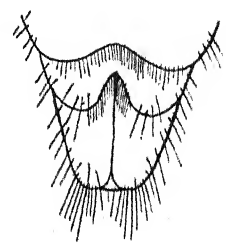

Fig. 12. *L. jacobsoni.* Fort de Kock.

The following Table is an attempt to separate the species on general characters, but these being entirely comparative, dependent on slight differences in the shape of the head, puncturation, etc., it cannot be regarded as very satisfactory.

1. Thorax (usually) reddish-brown. ..... 2.
Thorax (usually) reddish-yellow. ..... 7.

2. Thorax with sharp shining median keel throughout; very closely punctured ..... *carinatus* Cam.

Thorax with more or less distinct smooth median shining line, not sharply carinate. ..... 3.

3. Head a little broader than long, the posterior angles more briefly rounded. ..... 4.
Head as broad as long, the posterior angles more broadly rounded ..... 5.

4. Penultimate joints of antennae a little longer than broad; thorax less closely punctured. ..... *vilis* Kr.
Penultimate joints of antennae as long as broad; thorax more closely punctured. ..... *jacobsoni* n. sp.

5. Penultimate joints of antennae a little longer than broad. ..... 6.
Penultimate joints of antennae as long as broad. ..... *fuscipennis* Kr.

6. Thorax more closely punctured. ..... *timorensis* n. sp.
Thorax less closely punctured. ..... *penicillata* n. sp.

7. Head larger, broader than long. ..... *distinguenda* n. sp.
Head smaller, not broader than long. ..... 8.

8. Head slightly dilated behind the eyes. ..... 9.
Head not dilated behind the eyes. ..... 10.

9. Thorax with well defined smooth median line throughout. ... *nigriceps* Kr.
Thorax with trace of smooth median line behind. ..... *ochracea* Gr.

10. Penultimate joints of antennae a little longer than broad ... *lamellifer* n. sp.
Penultimate joints of antennae as long as broad. ..... 11.

11. Thorax more sparingly punctured. ..... *sororcula* Kr.
Thorax more closely punctured. ..... *sordida* n. sp.

15 Teesdale Road, Leytonstone, E.11.
September 22nd, 1928.

Additional Records of Coleoptera from the Isle of Wight.—I have only recently read in the Proceedings of the Isle of Wight N.H. Society for 1921 and 1927 two very interesting contributions by Mr. H. G. Jeffrey, supplementing the Lists of Coleoptera edited by Mr. Morey,* and bringing the number up to a total of 1,755 species, quite an excellent result for so comparatively small an area. I can confirm a number of his records from other localities and give below a few further additions to the List for the island :—

Alverstone : *Bembidion lunulatum* (and at Bembridge). Bembridge : *Agabus undulatus*, *Rhantus notatus*, *Atheta* v. *orbata*, *Gyrophaena laevipennis* (S. Blenkarn). Luccombe Chine : *Dryops luridus*. Niton : *Longitarsus exoletus* (and at Ventnor). Sandown : *Amara bifrons* and *infima*, *Calathus fuscus*, *Agonum versutum*, *Zyras cognatus*. Ventnor : *Bembidion concinnum*, *Atheta valida*, *Stenus erichsoni*, *Micrambe villosa*, *Apion gyllenhali*.—C. E. Stott, Armitage, Staffs. : *October 17th*, 1928.

Sinella myrmecophila Reut. (*Collembola*) *in Britain.*—A solitary specimen of this myrmecophilous Collembolid was captured along with several specimens of the ant *Ponera punctatissima* Roger in a bone-works in Bristol, Aug. 21st, 1928. Several further specimens of *Sinella* were seen later but not captured. For identification of the ant I am much indebted by Mr. Donisthorpe. As far as I can ascertain *S. myrmecophila* has not previously been recorded as British.—H. Womersley, Sunny Meads, West Town, Somerset : *September 26th*, 1928.

* 'A Guide to the Natural History of the Isle of Wight, edited by F. Morey, Newport and London, 1909.

NEPTICULA ALBIFASCIELLA HEIN.: ITS EARLY STAGES AND ITS OCCURRENCE IN BRITAIN.

BY E. C. R. WATERS, M.A., F.E.S.

In Vol. XV of the 'Berliner Entomologische Zeitschrift,' p. 222 (1871), Heinemann described under the name *albifasciella* a new species of *Nepticula*, on the strength of two females bred by himself from oak, and one specimen bred by Dr. Schleich. He distinguished it from *N. apicella* Stt. (=*argyropeza* Z.) by the brighter ferruginous colour of the head and the yellowish collar; from *N. subbimaculella* Hw. by the absence of a basal white spot and differences in the colour, position, etc. of the costal and dorsal spots. In Heinemann and Wocke's 'Schmetterlinge Deutschlands und der Schweiz,' vol. III, part 2, p. 769 (1876), the description was repeated in a condensed form; apparently no additional material was then available. In Snellen's 'Vlinders van Nederland,' vol. II, part 2, p. 1002 (1882), *albifasciella* was mentioned as an inhabitant of Holland, on the strength of two bred and two captured examples, all females, identified by Heinemann himself. Snellen pointed out further distinctions between *albifasciella* and *subbimaculella*, yet concluded by suggesting that the former might be merely a variety of the latter. Staudinger and Rebel, in their 'Catalog der Lepidopteren des palaearctischen Faunengebietes,' third edition, part II, p. 228 (1901), accepted this suggestion, and treated *albifasciella* as a variety of *subbimaculella*.

Hazardous though it may now appear to describe a new *Nepticula* on the basis of so few specimens and without an adequate knowledge of its early stages, *N. albifasciella* is a good species. The fact that it was bred from oak separates it conclusively from *N. argyropeza*, which is attached to aspen. The absence of any basal spot and the different shape and relative position of the costal and dorsal spots separate it clearly from *subbimaculella*. Herr W. Petersen, of Nömme, Esthonia, who will shortly publish an important paper on the genitalia of the *Nepticulidae*, has kindly informed me that the genitalia of *albifasciella* distinguish it with certainty from *subbimaculella*. Its specific distinctness may now be confirmed by an account of its early stages, both the larva and the mine being found to differ consistently from *subbimaculella*. Fifteen specimens bred in April and May, 1928, from oak-feeding larvae which had been carefully isolated, show complete consistency in the markings of the imago, and agree so closely with the description of *albifasciella* that there need be no hesitation in identifying them with that species. It would have been more

satisfactory if they could have been compared with examples actually named by Heinemann; but the whereabouts of his specimens is unknown to me, and Mr. Meyrick (to whom I have submitted specimens) supports me in regarding the comparison as superfluous.

As *N. albifasciella* has not hitherto been recorded from Britain, a brief description of the imago, as well as of the earlier stages, is here appended.

Imago. *Antennae* $\frac{2}{3}$ to $\frac{1}{4}$, dark fuscous, pale beneath. *Head* rather long-haired, ferruginous-ochreous to dark ferruginous, sometimes darker on the crown; *antennal eyecaps* ochreous-white or ochreous. *Thorax* dark fuscous, rather shining. *Forewings* dark fuscous, rather coarsely scaled; a small irregular glossy whitish ochreous-tinged spot on costa, roughly triangular, the anterior angle prolonged towards base of costa, the posterior angle reaching $\frac{1}{3}$; a larger glossy whitish ochreous-tinged spot on dorsum at $\frac{1}{2}$, triangular with equal sides or broadest on dorsum, its apex pointing to just beyond the apex of the costal spot; sometimes the costal and dorsal spots unite to form a whitish fascia, outwardly oblique, with inner edge concave, outer edge faintly concave or straight; *cilia* beyond a dark dividing line white tinged with grey or ochreous, greyer on costa and tornus. *Expanse* 4·5–6 mm. *Hindwings* grey; *cilia* about 4, grey. *Underside* of fore- and hindwings shining grey. *Abdomen* shining dark fuscous, ♂ with ochreous or ferruginous anal tuft. *Legs* shining dark fuscous.

Egg a silvery globule, invariably placed against a nervure, usually the midrib, on the upper surface of an oak leaf.

Larva 4–5 mm. long when full-grown; pale greenish-yellow, head and mouth-parts brown, prothorax with two longitudinal dark brown lines dorsally and a quadrangular blackish patch ventrally, dorsal vessel bright green; mining, with venter uppermost, in leaves of oak (*Quercus robur*). When the larva is about to pupate, the dorsal vessel becomes of the same colour as the rest of the body. *Mine* at first a fine gallery, usually running straight along a nervure, but sometimes wandering irregularly or taking a short cut to another nervure; after a distance varying from 7 to 14 mm., the larva turns back upon its course and excavates an irregular oval or rectangular blotch, based on a nervure, varying in length from 6 to 13 mm. and in breadth from 3 to 6 mm. *Frass* black; in the gallery forming a thick central line, in the blotch deposited in an irregular heap along the nervure which serves as base. The larva quits the leaf through a semi-circular slit in the upper cuticle, on that edge of the blotch which is farthest from the base. The blotch, when held against the light, is pale greenish-yellow, not transparent, with a brown patch where the frass lies; when the larva has departed, the whole blotch ultimately turns brown.

Cocoon a flattened ovoid, 2–3 mm. long, about 1·5 mm. across, broadest at the end from which the imago emerges, the upper edge slightly flattened into a flange; compactly made, with a few projecting ends of silk; dark red or purplish-red, turning black under the influence of moisture; placed (in captivity) on a leaf or on tissue-paper. *Pupa-case* (when empty) light brown, hardly transparent; seldom projecting from the cocoon after the emergence of the imago.

The imago resembles *subbimaculella* in size and build, but is readily distinguished by the absence of a basal white spot. More-

over, in *subbimaculella* the costal and dorsal spots point in different directions and do not tend to form a fascia, the dorsal spot is erect, and its apex is some distance beyond the apex of the costal spot. Another difference, quite conspicuous if series of bred specimens are compared, lies in the colour of the pale markings; in *subbimaculella* they are plain white or creamy-white, in *albifasciella* regularly tinged with ochreous. The specimens of *albifasciella* originally described by Heinemann were evidently of the fasciated form; but the spots by no means always unite into a fascia. In a specimen before me, one of the forewings has the spots well separated, the other forewing a broad fascia. *Argyropeza*, which in several respects resembles *albifasciella*, has the pale markings much less distinct, while the costal spot is beyond the middle of the wing, and consequently the fascia is not oblique.

In spite of the very definite characteristics of the imago, *albifasciella* would probably have remained undetected in this country, had it not been for the distinct habits of the larva. A few years ago (see Ent. Mo. Mag., LX, 1924, p. 101) I drew attention to a peculiarity of the larva of *subbimaculella*, namely its habit of cutting out an acute-angled tongue of leaf-cuticle on the underside of the leaf, usually between the midrib and another nervure. In subsequent seasons I was puzzled by the fact that some of the *Nepticula* larvae in oak-leaves did not extend their blotches to the base of a nervure, or cut through the leaf-cuticle. In the autumn of 1926 some trees were noticed in Tubney Wood where the abnormal blotches were fairly plentiful, but empty of larvae. By keeping the locality in question under observation during the summer of 1927, I was able to obtain three larvae on August 25th and many on August 29th, and found them to differ considerably from the larva of *subbimaculella*, the dorsal vessel being green instead of reddish. From these larvae numerous cocoons were obtained, and the fifteen moths mentioned above were reared between March 23rd and April 29th, 1928. It is probable that the methods by which *albifasciella* was tracked down may be applicable to other species of *Nepticula* not yet distinguished. Among nearly 150 mines of *albifasciella* examined, only six have been found in which the blotch extends to the angle between the midrib and a nervure, and in no instance has the larva bitten through the under cuticle; the difference in habit may therefore be regarded as consistent.

One reason why *albifasciella* has hitherto been overlooked is doubtless the relatively early date at which the larvae feed. An

entomologist wishing to rear *subbimaculella* would naturally collect the larvae in late October or November, preferably when the leaves have fallen, hundreds being then obtainable under a single tree; whereas larvae of *albifasciella* are earlier, occurring chiefly in late August and September, and have almost all left their blotches by the time when *subbimaculella* begin to feed. Nevertheless the two species overlap to some extent; two larvae of *albifasciella* were found feeding on October 21st, 1928, although larvae of *subbimaculella* had already been noticed on October 14th. In any case the differences in the larvae and their blotches are so marked that no difficulty will be found in discriminating the two species.

N. albifasciella is probably a rather common species in Britain, though by no means so generally abundant as *subbimaculella*. During September and October, 1928, I have noticed its larvae or mines in many different localities; but though fairly plentiful in each locality on certain trees or branches (almost invariably the low overhanging branches of large oaks), they are absent from a great many others. In North Berkshire larvae have been found, not only in Tubney Wood, but also in Wytham Woods (September 30th and October 21st) and at Cothill (October 2nd), while empty mines have been seen in Bagley Wood (October 14th). In Hampshire *albifasciella* occurs in the New Forest (about two dozen larvae and many empty mines collected in the Whitley Woods by my wife and myself on September 25th) and at Waggoners Wells, near Bramshott (a larva found by my wife in a fallen leaf on October 7th. In Surrey, empty mines have been found at Mickleham (October 8th) and Chiddingfold (October 9th). In the British Museum examples of the imago have been detected, under the name *subbimaculella*, in the General (European) Collection, one obtained by Stainton in the sixties (labelled merely 'England'), others by Lord Walsingham (probably from Merton, Norfolk); also in the collections of Dr. J. H. Wood (several examples, probably from Herefordshire) and Mr. E. R. Bankes (a fine specimen from Bloxworth, Dorset, dated May 26th, 1893, and two poor specimens from Corfe, June 11th, 1890, and June 10th, 1891). The last-mentioned examples give us May and June as the natural time of flight of the imago in this country. On the Continent *albifasciella* is recorded from Brunswick (Heinemann), Stettin (do.), the Hague (Snellen), Breda and Helvoirt in North Brabant (do.).

184 Woodstock Road, Oxford.
October 23rd, 1928.

OBSERVATIONS ON *GLYPHIPTERYX SCHOENICOLELLA* Boyd.

BY E. G. R. WATERS, M.A., F.E.S.

It is satisfactory to find that Mr. Meyrick, in the second edition of his 'Handbook of British Lepidoptera,' has recognised *Glyphipteryx schoenicolella* Stt. as a distinct species. The name *schoenicolella* should, however, be attributed to Boyd, whose inadequate description (a mere comparison with *G. equitella* Sc. and *G. oculatella* Z.) appeared in the 'Entomologist's Weekly Intelligencer' for July 31st, 1858, p. 144, whereas Stainton's first description (based on Boyd's) was published in the 'Entomologist's Annual' for 1859, p. 153. Stainton, like Boyd, explained how *schoenicolella* could be distinguished from *equitella* and *oculatella,* with which there is no real danger of confusing it, but omitted to make the much more necessary comparison with *G. fischeriella* Z.

Schoenicolella and *fischeriella* are similar in size and build; the alar expanse varies in both species between six and eight mm., though *schoenicolella* is larger on the average. But *schoenicolella* may always be recognised by the length and curve of the first white dorsal streak, which in *fischeriella,* if not obsolete, is short and straight; while the cilia of the hind-wings, wholly grey in *fischeriella,* become white on the basal half in *schoenicolella.* The last-mentioned feature, strangely overlooked by Boyd and Stainton, enables one to pick out *schoenicolella* at a glance, even in the field—no small advantage, seeing that the two species are sometimes abundant together. Mr. Meyrick has pointed out other differences, notably in the spacing of the white costal streaks.

Schoenicolella is further distinguished by its food-plant, *Schoenus nigricans,* and by various features of its early stages. Whereas larvae of *fischeriella* feed (in seed-heads of *Dactylis glomerata*) in July about a month after the flight of the imago, the next emergence not being till the following May and June, larvae of *schoenicolella* feed from May onwards, and produce imagines the same season. Seed-heads of *Schoenus* collected at Cothill (Berks) on July 2nd, 1928, were found to contain a good supply of larvae, some of which pupated shortly after in small cocoons on the lid of the tin in which they were placed, though many remained inside the seed-heads for pupation. From these larvae about forty examples of *schoenicolella* were bred between July 19th and August 3rd. In 1926, from seed-heads collected on June 31st, moths were bred on August 4th, 6th and 11th; from others, collected on August 14th, a single moth emerged on August 26th. In favourable seasons and localities, the larva could undoubtedly

be found at much earlier dates, probably from the beginning of May. The earliest date on which I have seen the moth in numbers at Cothill is June 12th, 1927, but Boyd found it swarming at the Lizard on May 29th, 1858, and I have a single example captured at Cothill as early as May 26th, 1916. Later dates are also possible; the moth was still fairly plentiful at Cothill on August 29th, 1927, while examples in the British Museum bear the dates September 19th, 1871 (Barrett), and September 21st and 23rd, 1848 (Stainton). No British *Glyphipteryx* is known to be double-brooded, and I have not succeeded in finding larvae of *schoenicolella* in the autumn (when, moreover, the seed-heads become dry). We may conclude that *schoenicolella* is probably single-brooded, but that the larvae feed at any time from early May to August, the moth being on the wing at any time from late May to late September.

The larva of *schoenicolella*, when full fed, is about four mm. in length and one mm. in diameter; pale yellowish-green, the head and prothoracic plate shining black, the dorsal vessel dark grey, the anal segment and plate of the penultimate segment black, hairs scanty and rather short. The larva of *fischeriella*, of which I had a large number before me in July, 1928 (cf. Stainton, Nat. Hist. Tin., XI, p. 272, and figure), is similar but distinctly smaller; on the penultimate segment it has blackish dots anteriorly and a transverse blackish line posteriorly, but no black plate.

Schoenicolella is widely distributed in southern England, and would probably be found in any locality where its local food-plant is plentiful. Besides Cornwall (the Lizard) and Berkshire (Cothill), it is known to occur in Kent (two of Stainton's specimens in the British Museum are from Lewisham), the Isle of Wight (a specimen captured at Yarmouth by Mr. Fletcher, see 'A Guide to the Natural History of the Isle of Wight,' edited by F. Morey, Newport and London, 1909, p. 435), Norfolk or Cambridge (two taken by Barrett in the British collection, and one taken by E. A. Atmore in the Bankes collection at South Kensington, all three without data), and Dorset. In the last-mentioned county, or at least its south-eastern portion, the species appears to be common; a long series in the Bankes collection includes twelve examples labelled 'Corfe' and six labelled 'Wych,' while Mr. A. W. Pickard-Cambridge possesses a long series from Bloxworth, and I myself took it at Poole, on August 29th, 1920. On the Continent it seems to be unknown, but must surely occur.

184 Woodstock Road, Oxford.

October 14th, 1928.

ODONATA COLLECTED IN AUSTRIAN TIROL, THE TRENTINO AND TUSCANY.

BY KENNETH J. MORTON, F.E.S.

Southern Tirol and the Trentino have a rich Odonate fauna. The region is, of course, one of great natural beauty and grandeur, with many lakes at a varied range of altitudes, most of them in a lovely setting of mountain and forest, making them ideal spots for collecting. When in the Italian Lade district in 1925, I collected at Riva and Sirmione, on the Lake of Garda, in September (Entomologist, lix, 1926), but the season was then too far advanced, and I had no opportunity of visiting the higher levels. In our excursion during the present summer, I was able to do more, and, although full justice may not have been done even to the localities visited, some notes on the results may be worthy of record. Excepting a short note by the late Mr. McLachlan (Ent. Mo. Mag., xxxii, p. 258) on a few Odonata and Neuroptera taken by his friends, Mr. Champion and Mr. Leman, in Tirol, I remember no previous references in our Magazines to the dragon-flies. Papers on Lepidoptera have been more numerous, and the Dolomites have been given a place in the front rank amongst the most delectable localities in Europe for collecting butterflies.

Leaving London on June 15th, we went direct to Vienna, spending a few days there and a like period in Budapest. The Natural History Museums in these cities were for me the chief attractions, and it is a pleasure to recall the charming courtesy of Dr. Zerny and Dr. Pongrácz, who spared no trouble in showing me the Odonata collections under their care.

My first dragon-fly capture was made under unusual circumstances. Our hotel in Budapest formed the four sides of a block of buildings, the open space in the centre having balconies around the upper floors, and at each corner of these stood oleanders planted in tubs. In the early morning, a dragon-fly was noted planing over the open space, its wings golden in the already bright sunshine. After a while it became tired, and settled on one of the oleanders. Running round to where it had alighted, I easily secured it with the fingers. It proved to be a sub-teneral female of *Somatochlora flavomaculata*, which must have wandered or been wafted far from its birth-place. Next morning another appeared, no doubt of the same species, but after flying about for a short time it soared away over the roofs.

Our first collecting station, from 23rd June to 1st July, was at Kitzbühel in the Austrian Tirol (2,500 ft.). Not far from the

town, and encircled by pine-woods, is a fine lake, the Schwarzsee, with many water-lilies, and surrounded by bogs, marshy meadows and springs. Dragon-flies were in great abundance; of these *Platycnemis pennipes* was everywhere at and near the lake, far outnumbering all the other species, which included, amongst the smaller ones, *Ischnura elegans, Agrion puella, A. hastulatum* and *Pyrrhosoma minium. Calopteryx splendens* was common at a brook near by. Of the larger species, *Orthetrum cancellatum, Libellula quadrimaculata* and *Sympetrum fonscolombei* were fairly common, with *O. coerulescens* just coming out. A few *Cordulia aenea* were noted, and on the last day or two *Somatochlora arctica* put in an appearance, but it was shy, and difficult to catch here. *Leucorrhinia dubia* was quite common at bog pools, not easy to obtain, however, on account of the nature of the ground. Another species of the genus may have been present, but all the examples of both sexes taken are *dubia.* At a small pond near the side of the road, in the direction opposite to that leading to the Schwarzsee, *A. puella* and *hastulatum* were also found, along with one or two *Aeschna cyanea,* which had just emerged.

We left this promising locality all too soon, and, by way of Innsbruck, went south to Levico in the Trentino. This place was selected on account of its lower elevation (1,640 ft.) and because of its proximity to two fine lakes, one of the same name quite near the town and the larger lake of Caldonazzo within half an hour's walk of the other, reached by a pleasant path through vineyards, along the corrected course of the stream flowing out of the lake and draining into the Brenta. Along this stream and the adjacent stream from the Levico lake, *Calopteryx splendens* was present in almost incredible numbers, and in lesser numbers it appeared at many different places in the neighbourhood of the lakes. I collected practically all round the Levico lake, but at the other only for a short distance about the outflow. At these lakes, *P. pennipes* was again the dominant species, embarrassing in its superabundance. *Ischnura elegans* and *Agrion puella* were common at some points but not so ubiquitious, while *Agrion lindeni* and *Enallagma cyathigerum* seemed to be comparatively scarce. *Onychogomphus forcipatus* was common; it frequented paths near the lakes and sandy beaches, and might also be seen flying over the outflowing streams. *Gomphus vulgatissimus* was only found just where the stream left the Caldonazzo lake, and it was not common there. No *Aeschninae* were seen, excepting one or two *Anax imperator.* One of these frequented an opening in the reed-girdle

near the bathing establishment nearly the whole time of our stay (2nd to 20th July), but it successfully evaded capture. *Somatochlora metallica* occurred sparingly along the lake margins. *S. flavomaculata* was first noted on the 17th, at a fine stretch of boggy meadow, not far from the outflow of Levico lake, and a short series of fresh males was taken; no doubt it would increase in numbers later, the locality being very suitable for the habits of the species. Here, *Sympetrum sanguineum* was especially common. The other species of this genus taken were *S. fonscolombei*, rather common, and single examples of *meridionale* and *pedemontanum*, the latter a teneral female, surely the forerunners of a more extensive representation of this genus for which it was still early enough in the season. Three species of *Orthetrum* occurred, *O. cancellatum*, *brunneum* and *coerulescens*. Judging from their condition, this was probably the order of their appearance. *O. cancellatum* occurred singly almost everywhere, frequenting not only the streams and opener parts of the lake shores, but also highways, lanes and vineyard paths. *O. brunneum* was fond of open spaces in the reeds, and perched on isolated reeds; it was less addicted to settling on paths than I have noted in some other localities. *O. coerulescens* became excessively common, and it was especially so at overgrown roadside ditches, near where the two outflowing streams crossed the road between Levico and Caldonazzo. Females of all three species in all stages of maturity were common away from water, more particularly in the wide, hot stony bed of the torrent which passes through the town, protected by high embankments, partly overgrown by rank herbage and bushes, the water at this season a mere trickle running over a rust-coloured bed. *Libellula fulva* occurred all round the Levico lake, and it seemed to be quite common, especially at the extreme upper end, and also about the outflow of Caldonazzo; the females specially favoured the lane leading from the town of Levico to the lake, where they were fond of perching on isolated dry twigs, and if one wanted them they were easily taken. *L. depressa* was more sporadic in its occurrence, and much less frequent than the other species.

I may mention that every example of *O. cancellatum* and *brunneum* of both sexes that I was able to capture (a great many not kept) was examined in the hope of finding *O. albistylum*, which has been recorded from Southern Tirol, but without success. My sole experience of the last-named species was in La Dombes, where I found it but was able to capture only one semi-adult ♂. This

part of the French Department of Ain, lying between Lyon and Bourg, is dotted over with a multitude of lakelets and étangs, and as far as I know it has not been visited by British entomologists excepting Mosely and myself, who spent a day collecting at St. Paul de Varax when on our way to Dauphiny at the beginning of July, 1925—an utterly inadequate visit. There must be many interesting insects in this region of somewhat unique character.

On the 21st July we exchanged the settled, rather hot, but not unpleasant summer weather of Levico for the cooler alpine conditions of San Martino di Castrozza (4,737 ft.). A good locality for the comparatively few dragon-flies of such high places was found near at hand. An extensive somewhat V-shaped meadow stretches westward from the village to the foot of the wooded hills. On one side of it there is a considerable torrent, across which, near the village, a dam or weir has been built to form a small artificial lake near a much-frequented café. A backwater of this lake (perhaps the site of a natural pond), partly open and partly overgrown with rank vegetation, was frequented by *Somatochlora alpestris* in numbers. They specially favoured a sphagnum-filled patch with very little surface water, the males either patrolling or hovering round the margins, and here several females were found ovipositing. Other species observed here were *Aeschna juncea, Agrion puella* and *Sympetrum fonscolombei.* On the other side of the meadow, farther from the village, little rivulets from the higher ground entered it and either meandered through the meadow, their courses hidden by the vegetation, or spread out into a swamp. At the extreme end the character of the meadow changed into true peat-bog. The drier parts had a scattered growth of dwarf pine, *Pinus Mughus. Somatochlora arctica* was common all over the wetter parts of this meadow; one morning before 10 a.m. I netted in quick succession four ♂♂ and one ♀. They flew as a rule only a foot or two above the herbage, an almost stationary hovering flight alternating with short darting forward movements; only once a higher, more joyous looking, flight was noted when the atmospheric conditions were stiller (not to be confused with the high, backwards and forwards flight of adolescent examples in sheltered sunlit places in the woods, or the occasional extended rapid flights which are probably of an exploratory nature). Long ago Ris has recorded the difference in habit of *S. alpestris* and *S. arctica*; the former, like *metallica*, almost invariably keeps to the open water, while *arctica* and *flavomaculata* fly over the wet meadows. Thus at San Martino, although *arctica* and *alpestris* were in close asso-

ciation, they did not intermingle. One of the little brooks referred to on reaching the meadow expanded in a slight hollow into a small open pond fringed with a scanty growth of *Phragmites*; its further course through the meadow could only be traced by the different character of the vegetation. Only at the small open part was *alpestris* to be found, and on this *arctica*, flying over the meadow near by, did not encroach. Two visits were paid to the Laghi di Colbricon (6,314 ft.). The two lakes lie close together, are connected by a small stream, and have a difference in altitude of only 15 metres. The shores of the higher are mostly rocky; one or two *S. metallica* were noted here, but the lake seemed barren in character and was a striking contrast to the other, which abounded in Odonate life. This latter had boggy margins nearly all round, a wide fringe of robust aquatic grass or sedge, and the bottom, at least near the sides, had a vigorous growth of vegetation (I failed to retain specimens of these plants for identification). At the end towards the outflow there is also a large stretch of peat-bog with some nice pools, at the sides of which *S. metallica* and *alpestris* females were found ovipositing. *S. metallica* seems to attain its highest development at such alpine lakes, and I have never before seen it in such abundance. *Aeschna juncea* and *Enallagma cyathigerum* were also very common, but of *S. alpestris* only two or three were seen. (Fridthjof Okland in a valuable work, 'Land und Süsswasserfauna von Nowaja Semlja,' (Oslo, 1928), for a copy of which I am much indebted to the author, gives some quotations from Zschokke's 'Die Tierwelt der Hochgebirgsseen,' which may be read with much interest as bearing on the apparent disparity in the amount of dragon-fly life at the two Colbricon lakes.) The only other species from San Martino still to be mentioned is *Aeschna cyanea*; it was not common. Two were found emerging at a small pool at the side of the meadow.

The first week of August was spent at Madonna di Campiglio, which we reached by way of Primolano and Trento, passing attractive-looking lakes on the way. At Campiglio we again found *S. alpestris* and *S. arctica* at several localities over 5,000 ft., chiefly in the valley of the torrent which comes from the Lago di Nambino. *Ae. juncea* was also common in this valley. At a marshy expansion only a few square yards in extent, on a trickling stream running through a small sloping meadow in the woods near the torrent and a short distance above the village, four females of *S. arctica* were observed ovipositing on the 6th between 3 and 4 p.m. They arrived in quick succession at this seemingly much favoured

spot, near which several males had been taken. Next day a female was seen at the same place, but it did not remain. A small artificial lake below the village produced *E. cyathigerum* and *Ae. juncea*. A male of *Ae. cyanea* was noted here and also a few *Sympetrum fonscolombei*. The latter species seldom fails to appear at such elevated lakes and is very often to be seen ovipositing, but it is more than doubtful that it maintains itself continuously at these high-lying places, the supply being kept up by fresh immigrants from the lower parts of the valleys. A single female of *meridionale* is probably also to be placed in the category of a wanderer; an adult male of *scoticum* was no doubt native. I visited the Lago di Nambino (5,800 ft.) once; although more promising looking than the higher Colbricon lake, I found no Odonata at the lake itself, but noted *S. alpestris* about pools in the adjacent spring-fed bog. Quite a number of other lakes exist in the neighbourhood, and some of them may be more productive than I found Nambino to be, but I was unable to visit them.

From Campiglio we motored over the Mendola Pass to Bolzano, thence proceeding by train to Innsbruck and Zürich, where we spent one or two delightful days and met again our old friend Dr. Ris.

As a further small contribution to Italian records of Odonata, I take this opportunity of mentioning the few species observed at Ronta, Mugello (1,200 ft.) in the Apennines, about 20 miles from Florence, where we spent a most enjoyable holiday from 15th July to 12th August in 1927. The district, however, proved lacking in variety of water conditions, and was generally far too dry for many Odonata. The river, of no great volume in summer, flows through the hot valley in a rather deep, mostly rocky channel, this uniform character only relieved where small land springs form a few separate permanent pools, and at one point where a short canal or millrace has been made to give power to an old riverside mill. The river itself seemed to produce *Onychogomphus forcipatus* only, which was by no means rare; the pools a few *Orthetrum brunneum* and *coerulescens*. while the canal teemed with the beautiful *Calopteryx haemorrhoidalis*. Mixed with the latter, but at the time of our visit rather rarely, *C. splendens* occurred, of a form similar to that found at Pavia and perhaps generally in northern Italy—that is to say, with the extreme tip of the wings narrowly hyaline—and even in this locality so far south not of the meridional *xanthosoma* form. Near this canal, and certainly residents, *Lestes virens* and *Sympecma fusca* were found in small

numbers. A few *Libellula depressa* were taken, and odd examples of *Sympetrum striolatum*, *Crocothemis erythraea* and an *Aeschna*, probably *mixta*, were seen, but these three may have been visitors from the more favourable localities lower down the valley which we passed when we motored one day to Florence.

13 Blackford Road, Edinburgh.
September 1928.

Liodes (*Anisotoma*) *stenocoryphe Joy in Berkshire.*—On September 16th, 1928, I had the good fortune to take a ♂ specimen of *L. stenocoryphe* Joy at Tubney, Berkshire.—a most unexpected capture. It will be remembered that the late Mr. W. E. Sharp took a ♂ and ♀ at Forres, Morayshire, the only known British examples of this species until the present capture. In his paper on 'A Revision of the British species of *Liodes* Latreille' (E.M.M. XLVII, p. 173, 1911) Dr. N. H. Joy described *L. stenocoryphe* as a species new to science. After comparing my specimen with those of the genus in my collection, and failing to identify it, I consulted Dr. Joy's paper, and, as I found many details of his description of *L. stenocoryphe* to agree with my insect, I sent it on to him for confirmation. Dr. Joy writes: 'I am very interested in your capture and pleased. I agree it is *L. stenocoryphe*. I am also pleased you have been able to make it out from my table, and am very glad it has turned up again.'

Tubney is an excellent locality for many of the rarer species of *Liodes*. Such nice forms as *L. cinnamomea* Panz., *L. anglica* Rye., *L. triepkei* Schm., *L. rugosa* Steph., *L. curta* Fairm., *L. brunnea* Sturm., *L. lunicollis* Rye., *L. algirica* Rye., *L. litura* Steph., have been found there, some of them more or less commonly. The genus *Liodes* is now known to be specially well represented in the Oxford district, the result of much time and labour having been devoted to them by Commander Walker, myself and others. I have sixteen species of *Liodes* from this district including all those mentioned from Tubney. *L. lucens* Fairm., which so far has evaded our search, is the only other species likely to occur here.—J. Collins, 74 Islip Road, Oxford: *October 12th*, 1928.

Colon appendiculatum Sahlb. in Berkshire.—By evening sweeping near Cothill, Berks, last June, I took a ♂ specimen of this rare and little-known beetle. In June 1925 I obtained a ♀ in the same district and was much gratified to make up the pair. With the exception of *C. brunneum* Latr. all the species of *Colon* are more or less rare in collections. I now have seven species of my own capture from the Oxford district.—J. Collins: *October 12th*, 1928.

Mites on Helophorus affinis Marsh.—With reference to Mr. B. S. Williams' note on a red mite under the elytron of *Helophorus affinis* Marsh. (E.M.M., 1928, p. 234), on April 11th, 1925, I took at Askham Bog, near York, a specimen of this species with a bright red spot on the right elytron which I observed faded after death, but did not investigate further. Unfortunately the specimen has been mislaid so that I cannot now verify the presence of a mite. Two entomological friends were with me at the time and they each took a similar example. I have frequently found *Helophorus aquaticus* L. with mites on the exterior, but these latter were apparently Gamasids, possibly *Gamasus coleoptratorum*. —W. J. Fordham, The Garth, Barmby Moor, York: *October 11th*, 1928.

Lepidilla kelloggi Rib. (*Pteroxanium squamosum End.*): *a new locality.*—Mr. J. H. Keys has kindly sent me a female example of this interesting scaly Psocid, which he took from a bird's nest from a tree in Chelson Meadow, Plymouth, on September 8th this year. The capture extends the known range of the insect in this country where it has now been recorded from Cumberland, Merionethshire, Gloucestershire, Somerset, Sussex and Devon. Outside England and Wales it has been found only in California, and in view of the possibility of its introduction from America information as to its occurrence in other localities, especially in eastern and midland counties, would be of interest Except in the more northerly districts the adults disperse from the colony soon after the first week in August and only stray examples are likely to be met with in the late months of the year, when it may occur under stones, logs, dead leaves, etc., or even in houses; apparently it can make rather long journeys when migrating. Notes on the insect, under Enderlein's name, and further references have been given in E.M.M. 1927, LXIII, p. 107.—J. V. Pearman, 32 Cornwallis Crescent, Clifton, Bristol: *September 20th*, 1928.

Pseudopsocus rostocki Kolbe: a further record.—After losing sight of this lichenophilous Psocid for three years, I took a few examples during a visit to the New Forest this year. They were beaten from the thickly lichen-encrusted branches of an oak in Holland's Wood, between Brockenhurst and Lyndhurst, on September 13th. No other similar oaks nor any other trees yielded any specimens. As the insect usually rests beneath the lichen thallus it is difficult to dislodge; it has also been found under scaling bark. Apparently very rare, the insect may be widely distributed. Up to 1925 I had reared three generations (two colonies) of the species, all producing only parthenogenetic females; the discovery of the possibly winged male would be of great interest. The known distribution of the insect is Germany—Westphalia (Kolbe, Ent. Nach., 1882, VIII, p. 208; Loens, Stett. Ent. Z., 1890, LI, p. 8): England—Gloucestershire (E M.M. 1924, LX, p. 122) and Hampshire.—J. V. Pearman: *September 20th*, 1928.

Society

Entomological Society of London: *Wednesday, June 6th*, 1928.—Mr. J. E. Collin, President, in the Chair.

Mr. H. M. Edelsten made a statement as to the progress that was being made with the establishment of *Chrysophanus dispar* at Wood Walton Fen. He said that it would be necessary to raise a fund for some of the expenses connected with it and made an appeal to the Fellows for contributions.

Mr. E. E. Green exhibited a remarkable Coleopterous larva from California, and quoted some remarks on it by Mr. G. F. Ferris of Stanford University. Dr. J. G. Myers read some additional notes on all-female families in certain insects. Dr. J. E. H. Roberts exhibited and made remarks on the larvae of the British Draonflies, *Somatochlora metallica* and *S. arctica*. Mr. G. J. Arrow exhibited a predaceous larva, probably a Panorpid, with drawings of it sent by Mr. T. Bainbrigge Fletcher from Upper Sikkim. Prof. E. B. Poulton, F.R.S., made the following communications:—(1) H. W. Simmonds' conclusion that all-female-producing females of *Hypolimnas bolina* form a persistent strain in Suva, Fiji; (2) The wet and dry season forms of *Precis octavia sesamus* Trim., taken *in coitâ* at Nairobi by Mr. G. H. E. Hopkins; (3) The discovery by Captain C. R. S. Pitman of the area in the West Nile Province of Uganda from which start the great southward migrations of *Belenois mesentina* Cram.;

(4) The larval cases from Uganda of the American clothes moth, *Tinola uterella* Wlsm., which has not previously been recorded from Africa, with a reproduction of Burchell's account of this moth from his Brazilian note-book; (5) A new Cockroach from Uganda with a description by Dr. Hanitsch; (6) An Agaristid moth from Uganda which at rest resembles the larva of a Grasshopper; (7) The European carpenter-bee, *Xylocopa violacea* L., taken at Dulwich in 1855; (8) Birds opening the oak-galls of *Cynips kollari* Hart. in order to eat the insect contents; (9) The distastefulness of an *Acraea* to a Chamaeleon as shown by an experiment by Dr. G. D. H. Carpenter; (10) A new Aegeriid moth from Uganda mimicking an Ichneumonid; (11) Notes on the epigamic behaviour and pairing of *Pyrrhosoma nymphula* Sulz., by himself and Dr. H. Eltringham.

The following papers were read:—(1) 'Observations on the bionomics of the Lepidoptera of Matto Grosso, Brazil,' by Mr. C. L. Collenette and Mr. G. Talbot; (2) 'The Rhopalocera of the Marquesas Islands, the Society Islands, the Tuamotu Archipelago, Rapa, and the Austral Islands,' by Miss L. E. Cheesman, Professor E. B. Poulton, F.R.S., and Captain N. D. Riley; (3) 'Horae Formosae. The Syntomidae of Formosa,' by Mr. A. E. Wileman; (4) 'New Hymenoptera from British Columbia,' by Mr. O. Whittaker, F.R.M.S.

Wednesday, October 3rd, 1928.—Mr. J. E. Collin, President, in the Chair.

The President announced the deaths of:—Professor C. Aurivillius, an Honorary Fellow, and of the Hon. Mrs. Beatrice Carpenter, Mr. C. L. Fox and Mr. F. C. Woodforde, Fellows of the Society.

The following was elected a Fellow of the Society:—The Rev. C. E. Tottenham, 60 Mt. Ararat Road, Richmond.

Dr. S. A. Neave communicated a note from Mr. E. Ballard on the subject of the affect of carnivorous habits in insects, especially in species of *Dysdercus*. Mr. H. Donisthorpe exhibited and made remarks upon rare Coleoptera from Windsor Forest, especially the Staphylinid *Atheta nidicola* Johan. Mr. H. M. Edelsten exhibited examples of *Chrysophanus dispar batavus*, from the colony established by the Society's Protection Committee at Wood Walton Fen. Mr. L. G. Higgins exhibited and made remarks upon a collection of butterflies from Styria, especially *Erebia* spp. Colonel M. J. Godfery made remarks on the fertilisation of orchids of the genus *Serapias* probably effected by seeking the flowers as a nocturnal shelter. Captain A. F. Hemming exhibited examples of *Baoris zelleri* Led., an unrecognised European Hesperid from Spain. Professor E. B. Poulton, F.R.S., made remarks:—(1) On the migratory Pyrale, *Nomophila noctuella* Schiff., resting on the calm surface of the sea; (2) An observation confirming Dr. van Someren's suggestion that the female form *cedrealis* Hew., of *Charaxes etheocles* Cram., is a mimic of two common species of *Euphaedra*; (3) The flight of the perfect males and females of ants and termites recognised by H. W. Bates as an adaptation to secure intercrossing.

The following papers were read:—(1) 'The Arctiidae, Noctuidae and Sphingidae of the *St. George* Expedition,' by Mr. C. L. Collenette; (2) 'The Microlepidoptera of the *St. George* Expedition,' by Mr. E. Meyrick; (3) 'Varieties of British Lepidoptera in the Hope Department, Oxford University Museum,' by the late Mr. F. C. Woodforde, B.A., Exeter College, Oxford, in collaboration with Mr. E. B. Ford and Mr. L. B. Prout; (4) 'Pollination of an Australian Orchid by the male Ichneumonid *Lissopimpla semipunctata*,' by Mrs. Coleman, communicated by Professor E. B. Poulton, F.R.S.; (5) 'Insect Nutrition and Metabolism. A Summary of the Literature,' by Mr. B. P. Uvarov.—S. A. Neave, *Hon. Sec.*

BIOLOGICAL OBSERVATIONS ON BRITISH PSOCOPTERA.

BY J. V. PEARMAN, F.E.S.

(*Continued from p.* 243.)

III. Sex Behaviour.

From the few references in the literature, it would seem that the mating habits of Psocids have seldom come under observation, due, probably, to the sex instinct operating over a limited period. In my own case, the whole business of pairing has been witnessed only in two species (*Psocus sexpunctatus* L., *Reuterella helvimacula* End.); in three others (*Psocus quadrimaculatus* Lat., *Elipsocus hyalinus* Steph., *Clothilla pulsatoria* L.) all the actions short of actual union have been seen. The behaviour of all these insects was essentially the same, and agreed so well with what has been noted by other observers that it is reasonable to suppose that it followed in all important particulars the usual procedure in Psocid mating.

Ordinarily the sexes dwell peaceably together, and if undisturbed the insects are, in the main, rather sluggish. When sexually stimulated, however, the males become highly excited, and run about seeking the females, at which time they will challenge and jostle any imago of their own species (but not nymphs) whom they may encounter.

In its overtures to the female, the male performs a curious courtship dance, during which the wings are held out half-opened and occasionally tremulously fluttered, while the abdomen is extended rigidly and apically upturned with the telson flaps expanded. In this attitude, always facing towards the female, he runs round her, occasionally stopping and butting her with his head. Should the female resent these advances she scuttles off, when the male often seems puzzled by her disappearance, and spins round with a comic air of bewilderment. If, however, the female is complaisant, she remains passive, in which case the male will cease his circling on coming in front of her, and the two insects stand for time face to face. Suddenly the male whisks round, and pushes his way rapidly backwards beneath the female, who raises the forepart of her body to facilitate his passage. Union is quickly effected, and the couple remain quietly together, the female partly supporting herself by placing the anterior and mid pairs of legs on the body of the male. In the few cases observed, the view has not been sufficiently clear for noting the interrelation of the male and female gonapophyses.

Having regard to the manner in which copulation is accom-

plished, there can, I think, be little doubt that the bristly sensory organs on the lateral telson flaps function as tactile position finders in pairing.* These structures were apparently first noticed and figured by Hagen [22], who referred to them as 'punktierten wulste'; they have been mentioned by various writers since, and described in detail and figured by Ribaga [26]. Almost identical groups of bristles have been found in several Neuropterous genera; Lundblad [24] has given an account of these, and, following Hansen and Dahl, calls the bristles 'trichobothria,' a term also used by Enderlein with reference to a totally different type of seta.

Where winged Psocids have been concerned, union has been voluntarily and easily abandoned about half an hour after pairing, but among the Atropidae it seems to be much prolonged, and was noted to endure for over four hours in a pair of *Lepinotus inquilinus* Heyd. The species of Atropidae while *in coitu* stand facing in opposite directions. Although it has not been ascertained in what manner copulation is initiated, a male of *Clothilla pulsatoria* has been watched courting a female by running round it and butting, somewhat after the manner of the winged species, and Derham's remark, that one individual mounts the other, suggests that the sexes at first unite in he same manner as other Psocids. Solowiow [27] records an observed case of copulation in this species lasting four hours, but gives no particulars of the method of pairing. Only once have winged Psocids been seen in the tail to tail attitude, and then it was probably an accidental position, the insects having been beaten into the net from the branches of a yew. The pair escaped before they could be identified.

It would appear that the females are agreeable to copulation either soon after recovering from the effects of metamorphosis, or when ready to commence ovipositing, and that the males are stimulated by an odour, perhaps emanating from a secretion expressed at such times from the genital organs. As a female *Psocus quadrimaculatus* was nearing the end of its pre-imaginal ecdysis, i.e., at a time when the abdomen was undergoing strain, males in the same cage and within a distance of about an inch were powerfully effected, and rushed excitedly to the moulting female, posturing around, climbing over, and endeavouring to thrust themselves beneath it and one another. On becoming free from the nymphal skin, the female ran off; the males attempting to trace her, frequently passed near her without detecting her presence, but were strongly attracted by her cast skin, in the

* I have suggested, p. 215, ante, a possible function for the corresponding organs in the female.

INDEX.

INDEX TO CONTRIBUTORS.

GENERAL INDEX.

SPECIAL INDEX.

[For the new genera, species, etc., described see pp. xv and xvi.]

COLLEMBOLA.

DIPTERA.

HEMIPTERA.

HYMENOPTERA.

LEPIDOPTERA.

ADDITIONS TO THE BRITISH INSECT FAUNA BROUGHT FORWARD OR NOTICED IN THIS VOLUME.

COLEOPTERA.

COLLEMBOLA.

DIPTERA.

HEMIPTERA.

HYMENOPTERA.

LEPIDOPTERA.

PROTURA.

LIST OF NEW GENERA, SPECIES, ETC., DESCRIBED IN THIS VOLUME.

COLEOPTERA.

DIPTERA.

HEMIPTERA.

EXPLANATION OF PLATES.

Plate I.—Watercress Stem-mining Larva (see pp. 126–8).
,, II.—*Erythroneura parvula* Boh. (see pp. 201–4).
,, III.—Portrait of James Edwards, F.E.S. (see p. 270).

ERRATA.

Page 12, line 9 from bottom, *for* '*Reg.*' *read* '*Rag.*'
,, 19, ,, 24 ,, top, ,, '*Hypolimmax*' read '*Hypolimnas*'
,, 65, ,, 3 ,, bottom, ,, 'invertebrates' *read* 'vertebrates.'
,, 101, ,, 9 ,, top, ,, '*humeralis*' read '*suturalis.*'
,, 140, ,, 16 ,, bottom, ,, 'Scorborough' *read* 'Scarborough.'
,, ,, ,, 14 ,, ,, ,, 'Skipworth' *read* 'Skipwith'
,, ,, ,, 12 ,, ,, ,, 'segretion' *read* 'segregation.'
,, 141, top line, ,, '*misella*' read '*miscella.*'
,, 185, ,, 21 ,, top, ,, 'tympani' *read* 'tympana.'
,, 186, ,, 4 ,, ,, ,, '64' *read* '44.'
,, 202, line 7 ,, bottom, ,, 'iridiscent' *read* 'iridescent.'
,, ,, ,, 4 ,, ,, ,, '*malasides*' read '*malacoides.*'
,, 203, ,, 2 ,, ,, ,, 'sergent' *read* 'segment.'
,, 252, ,, 4 ,, ,, ,, 'June 31st' *read* 'July 31st.'